McCann

LUPTON

PRODUCTS SERVICE

No 8

LUPTON PRODUCTS
FOR LIGHT AND VENTILATION

DAVID LUPTON'S SONS COMPANY

ALLEGHENY AVENUE AND JANNEY STREET

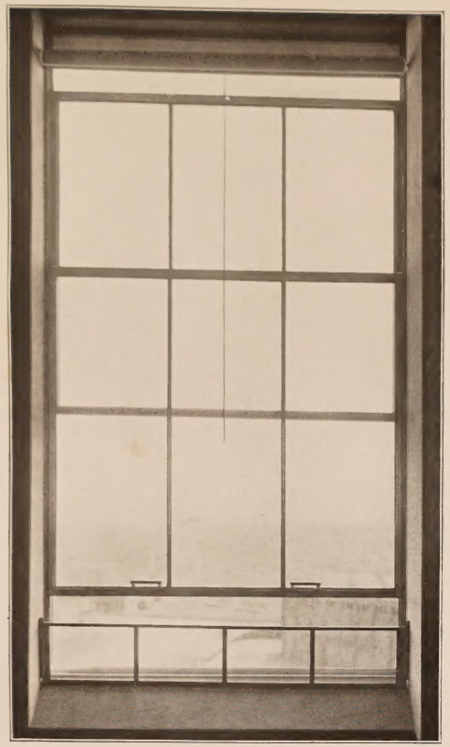
PHILADELPHIA, PA.

CHICAGO NEW YORK PITTSBURGH

From
Lombard & Tracy Co.
161 Devonshire Street
Boston, Mass.

Please Destroy No. 7 and All Previous Specialty Catalogues

161 Devonshire Street
Boston, Mass.



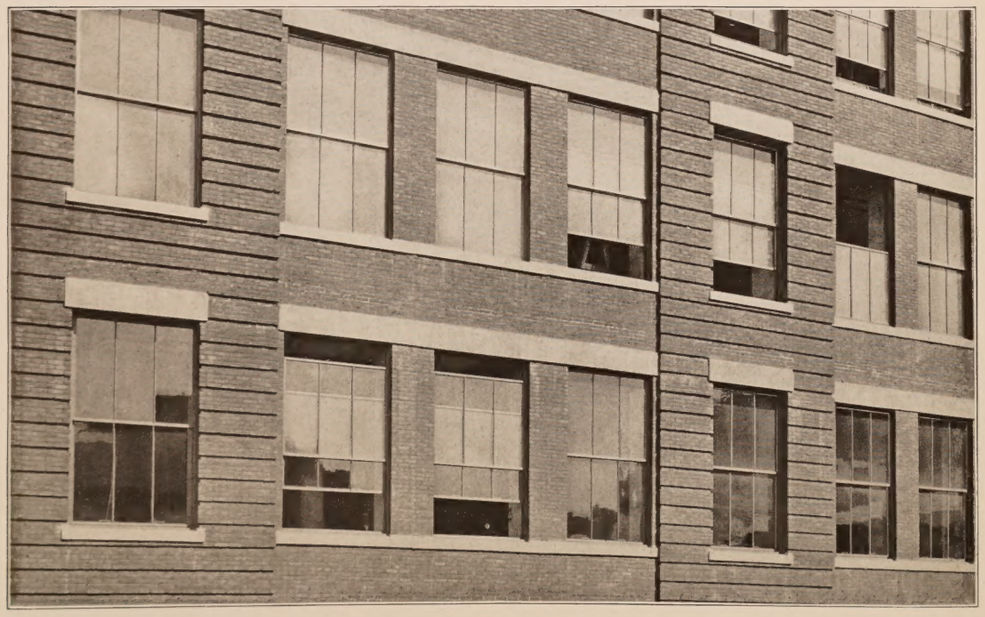
Lupton Steel Sash

Counterweighted Type

Every detail of this window, from the rolled bronze weather stripping to the solid welded one-piece sash, is designed to make it the most simple and effective window for hotels, office buildings and fine residences.

Well-made joints are good, but these jointless sash are better looking and cost less to maintain.

Your screen, shade and window-cleaning problems are all easy when counterweighted sash are used.



General Electric Company, Schenectady, N. Y., Laboratory

Lupton Steel Doors

The seamless tube and oxy-acetylene torch make this door many times stronger for its weight than built-up doors. The tube also conceals the lock and hinges.

The one-piece welded jamb and trim are made to special details when required.

These doors are also made with a single metal panel without glass.

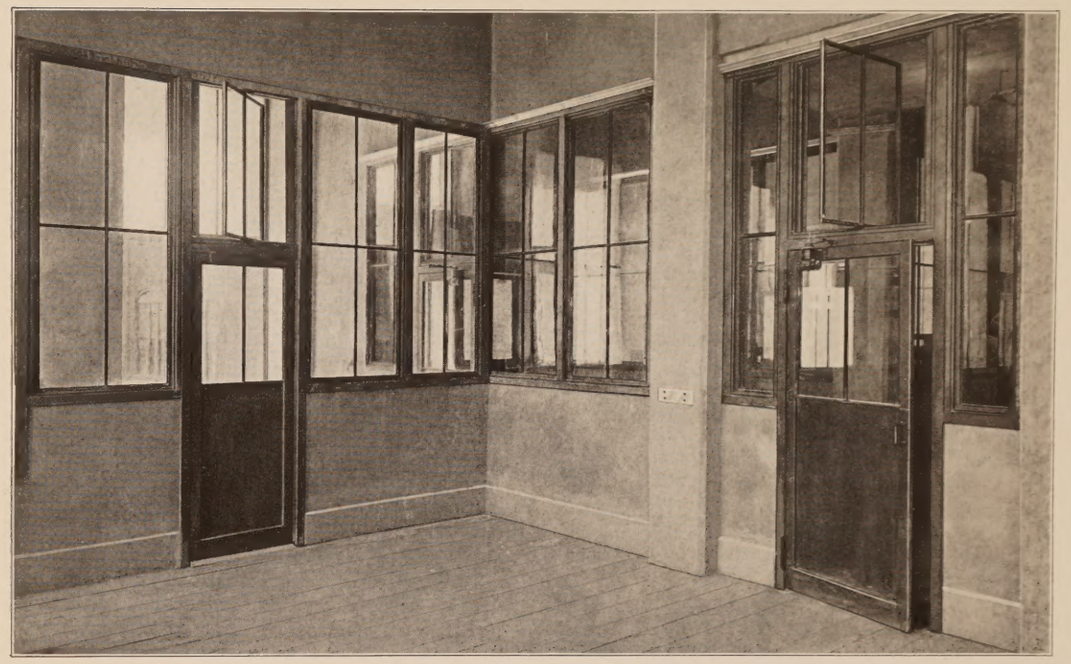
Lupton welded tube doors at main entrance

Lupton Steel Partitions

Lupton Steel Partition, standard units, are easily moved and re-erected without removing glass. See details on page 39.

Office arrangement is easily changed by moving the portable partition.

Lupton Steel Doors and Sash for Plaster Partitions



Lupton Steel Doors and trim were used on the first four floors on account of certain laboratory requirements.

Door jambs and trim are one piece, with all mitered joints welded. Doors and jambs are all welded in one piece.

Lupton Steel Partitions, standard units, are used on the fifth, sixth and seventh floors, as shown on page "C," and are recommended for general office use in preference to the combination plaster and steel sash partition, which do not permit changes of office arrangement.

The Lupton Steel Sash and Doors for plaster partitions are all special, and are made in sizes to suit the requirements of each building.

Compliments of Willie Russell.

Laboratory Tests of Steel Sash and Partitions

Messrs. Harris & Richards
Consulting Engineers and Architects

Mr. G. E. Emmons, Manager

Mr. C. G. Hulth
Superintendent of Buildings and Grounds

LABORATORY
GENERAL ELECTRIC COMPANY, SCHENECTADY WORKS

The latest development of Counterweighted Type of Lupton Steel Sash with rolled bronze double weathering, welded joints and continuous glazing angles, were required to make this laboratory air- and dust-proof.

The Lupton steel windows, welded tube doors and partitions would, without other fire protection, localize fire damage and prevent loss of invaluable experimental data.

The Lupton counterweighted windows with rolled bronze double weathering are particularly adapted for office buildings and fine residence work. Difference in price over ordinary windows is more than offset in the saving in cost of heating the building.

The investment value is increased by reducing the fire hazard and cost of maintenance and expense of heating the building.

LUPTON SERVICE - - - - - - - - - - - - - - Page 2

LUPTON STEEL SASH, STANDARD CONSTRUCTION - - - - - Page 3

Full Size Details of Members - - - - - - - - - - Page 8
Ventilator Details - - - - - - - - - - - - Page 9
Standard Units - - - - - - - - - - - - Page 10
Ventilator Arrangement - - - - - - - - - - - Page 11
Stock Numbers - - - - - - - - - - - - Page 11
Glass Sizes in Ventilators - - - - - - - - - - - Page 11
Sash Widths and Heights - - - - - - - - - - - Page 12
Directions for Figuring Sash Sizes - - - - - - - - - Page 13
General Information - - - - - - - - - - - - Page 14
Details of Sash in Concrete Work - - - - - - - - - Page 15
Details of Sash in Brick Work - - - - - - - - - - Page 16
Details of Sash in Steel Work - - - - - - - - - - Page 17

LUPTON STEEL SASH, SPECIAL TYPES
Packard Type - - - - - - - - - - - - - Page 24
Projected Ventilator Type for Hospitals - - - - - - - - Page 26
Power House Type - - - - - - - - - - - - Page 27
Counterbalanced Type - - - - - - - - - - - - Page 31
Counterweighted Type - - - - - - - - - - - - Page 35

LUPTON STEEL PARTITIONS - - - - - - - - - - - Page 38
Sanitary Toilet Rooms - - - - - - - - - - - - Page 42

LUPTON STEEL TUBE DOORS AND JAMBS - - - - - - - - Page 43
Hinged Type - - - - - - - - - - - - - Page 44
Sliding Type - - - - - - - - - - - - - Page 45

POND CONTINUOUS SASH
Full Size Details of Members - - - - - - - - - - Page 46
Sawtooth Construction Details - - - - - - - - - - Page 50
Monitor Construction Details - - - - - - - - - - Page 52
Pivoted Type - - - - - - - - - - - - - Page 55

POND TRUSS
Foundry and Forge Shop Type - - - - - - - - - - Page 56
Glass Furnace Type - - - - - - - - - - - - Page 61
Power House Type - - - - - - - - - - - - Page 62

LONG SPAN SAWTOOTH TRUSS - - - - - - - - - - - Page 65

POND OPERATING DEVICE - - - - - - - - - - - - Page 66
Spirals and Counterweights - - - - - - - - - - Page 70
Operating Device Analysis - - - - - - - - - - Page 71
Motor Driven Power - - - - - - - - - - - - Page 73

LUPTON ROLLED STEEL SKYLIGHT - - - - - - - - - - Page 76

LUPTON SHEET METAL FIREPROOF WINDOWS - - - - - - - Page 80

WALDMIRE LOUVERS - - - - - - - - - - - - - Page 83

RECENT INSTALLATIONS - - - - - - - - - - - - - Page 84

Lupton Service

Lupton Service is maintained for the purpose of giving authoritative information concerning problems in daylighting and natural ventilation. This service is based on our specialized experience extending over a period of more than forty years.

Each type of building requires special treatment to get really efficient light and ventilation; and each building of a type will have some individual requirements, owing to location, position as regards nearby buildings, methods of manufacture, etc., which must be carefully studied.

Well lighted and ventilated buildings are not the result merely of the use of the right products, but rather of the correct use of the right products in construction properly designed to receive them.

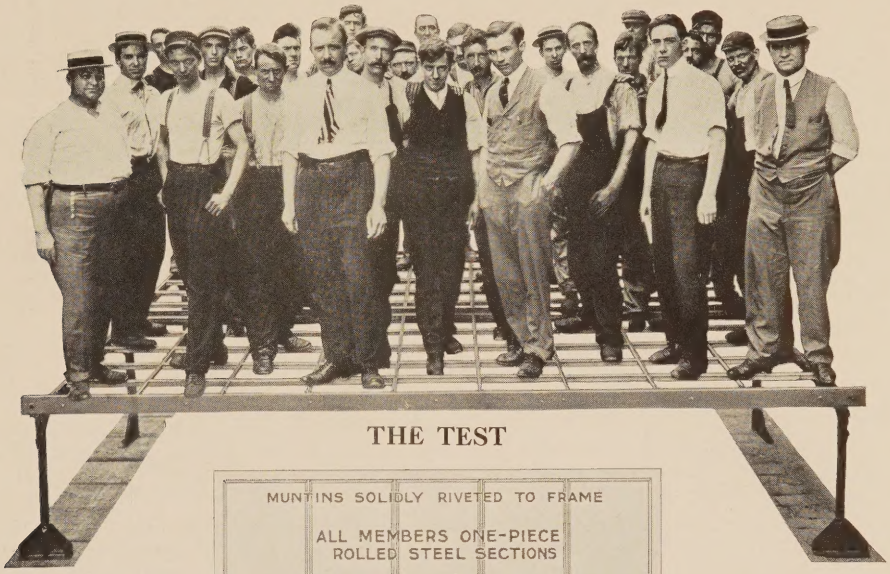
It is in showing what the correct use is, and in designing the proper construction, that Lupton Service demonstrates its value. We will act in an advisory capacity to architects, engineers or owners and prepare, without charge, comprehensive drawings showing most effective roof formations, types of sash with necessary lighting and ventilating areas, and their locations to give best results for buildings of any size and for any purpose.

We call attention to the various designs, such as Pond Trusses for Foundries and Forge Shops and for Power Houses, shown in this catalogue. Lupton Service originated these designs to obtain certain results desired by our clients.

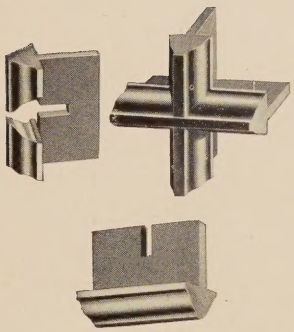
We invite consultation with our Service Department. The best results are obtained if our suggestions are given before finished plans are made. We should have complete data as to use of building, location of columns, length, width, height, number of stories and any special requirements.

"Tested the Way the Wind Blows"

THE ONLY PRACTICAL TEST OF SASH STRENGTH

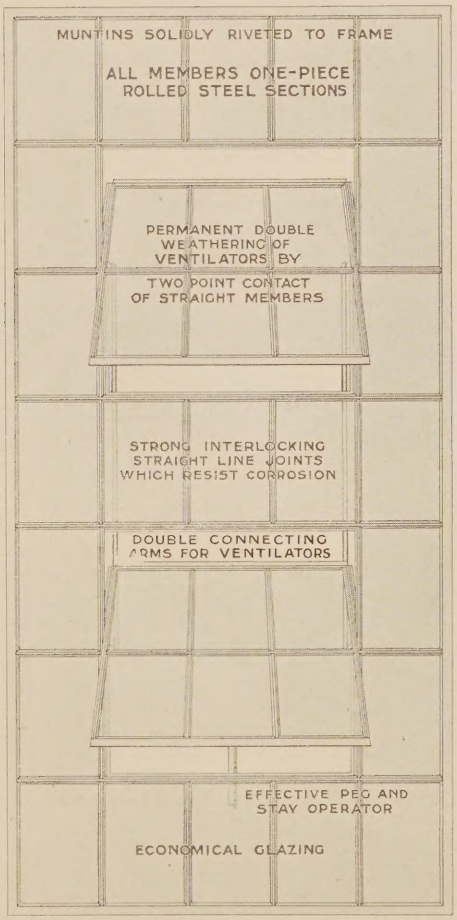


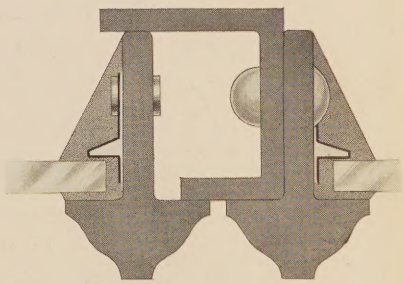
THE TEST



THE JOINT

The joint at the intersection of the solid one-piece rolled steel members assures strength, durability, and least opportunity for corrosion. The metal removed does not impair strength of the sash. The straight line joint preserves desired architectural effect. Parts are accurately machine cut.





THE DOUBLE WEATHERING

The double weathering on all sides of the ventilator is obtained by a two-point contact of straight surfaces parallel with the glass, making a permanently weather- and windproof ventilator construction. Lupton ventilators reduce cost of heating a building.

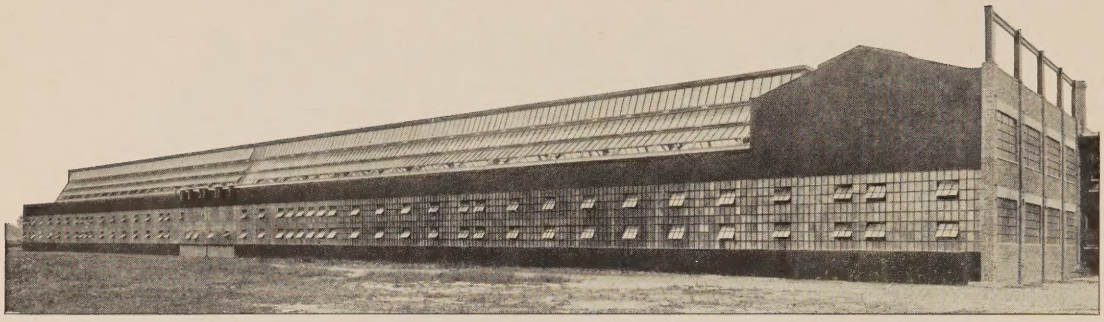
THE RESULT

Maximum efficiency in steel sash construction

LUPTON STEEL SASH

Lupton Steel Sash

(Patented, and patents pending)



Where Lupton Steel Sash Are Made
Steel Sash Department, Lupton Factory, Philadelphia. This building, 70 by 412 feet, is devoted exclusively to the manufacture of Lupton Steel Sash

There are certain fundamental principles of good steel sash construction; among which are solid one-piece rolled steel members, joints which resist corrosion and do not impair strength of sash, permanently tight weathering of ventilators, simplicity of glazing. We believe that a study of Lupton Steel Sash construction will convince the reader that these essential features in their highest development are found in Lupton Steel Sash.

MEMBERS — Lupton Steel Sash are made of low-carbon steel, specially rolled for us in solid one-piece sections. Each member is of a shape and weight to give maximum strength and rigidity to the finished sash. Built up sections, composed of several light members, are necessarily heavier in the aggregate than one-piece sections, but such additional weight does not necessarily add to the strength of the sash. Lupton one-piece sections can be attacked by rust only from the outside, and this can be prevented by an occasional coat of paint. The internal surfaces of built-up sections are subject to corrosion and there is absolutely no way of reaching these surfaces with paint. Sash strength is of course important and it is obtained in Lupton Sash by solid sections ingeniously interlocked at the joints; but prevention of corrosion is equally essential, and corrosion can be successfully resisted only by the use of one-piece members which have a suitable amount of metal on the weather side of the sash.

JOINT — The joint at the intersection of the members is made to give greatest strength against direct wind pressure while providing amply for wind suction. The greater the strain put on the Lupton Joint from the outside, from which the greatest strain naturally comes, the tighter becomes the lock of the intersecting members. In addition to its strength the Lupton Joint gives least opportunity for the entrance of moisture and consequent corrosion. The preservation by the Lupton Joint of the straight lines of sash will appeal to many who object to the excrescent effect of a curved joint. Muntin members are carefully fitted into frame members and are solidly riveted; no loose slot and bent tongue connections are used.

VENTILATORS — Ventilators are constructed with a two-point contact of straight surfaces parallel with the glass. This double weathering is continuous all around the ventilators. The straight surfaces of weathering members permit of adjustment so that contacts are not dependent upon the accuracy of the rolled sections, as in the case of curved winged members. Sections used at top and bottom of ventilator form a drip at these points. There is a continuous dead air space at all sides and provision is made for the removal of condensation outside of sash. Lupton ventilator construction is permanently weather- and windproof, and has a marked influence on reducing the heating cost of a building. Ventilators are hung on heavy malleable iron pivots with bronze pins. To facilitate cleaning ventilators they can be opened to an angle of 90 degrees. Ventilators when operated individually are equipped with peg and stay; the latter is notched and holds ventilator securely open at various angles. When the ventilator is closed the stay folds back against the sash and locks over a round head peg. When two ventilators occur in a sash one above the other, they are connected by two arms with brackets attached at pivots. These double arms assure the control of both ventilators in exact alignment, doing away with the necessity of slamming the lower ventilator in order to close the upper one, and preventing breakage of glass. Spring catches will be provided at additional cost, instead of pegs and stays, so that the ventilators may be operated by chains or cords. For automatic closing, pivots are placed above center and ventilators close by gravity when the fusible link in chain melts at a temperature of 150 degrees. A special type of Pond Operating Device is applied to Lupton Steel Sash when it is desired to control ventilators in lines. This device embraces the essential points of construction found in all Pond Operating Devices.

No single sash should contain an area greater than seventy square feet; larger sizes are awkward to handle and difficult to erect (see page 10). All units of the same height are interchangeable. Required widths of openings or amount of ventilation are obtained by grouping units of different widths or having different ventilating areas.

Ventilators may be placed in sash wherever desired. They should not exceed five feet in width, nor five feet in height, nor contain an area greater than eighteen square feet. On page 10 is shown the limit of sash widths in which we recommend the use of ventilators. The best use of ventilators is shown on page 11. When ventilators extend full width of sash, care should be taken to have sufficient clearance between sash and walls so that

ventilators may open freely. Additional clearance must be allowed for sash in which there are two ventilators, each full width of sash, in order to give working space for connecting arms (see page 13).

FRAME MEMBER

On page 8 the several Lupton Steel Sash frame members are shown. Sections 101 and 108 are most commonly used. For sash set in brick or concrete walls and in steel framing we recommend the use of Section 108. Details showing the application of these sections to various conditions are given on pages 15, 16 and 17.

When standard mullion Sections 102 or 116 are used, Section 101 is placed at the mullion jambs of sash (see F, page 9), but Section 108 may be used at the opposite jamb and at head and sill. No additional charge is made for using Section 101 and 108 in combination on a sash. The T-bar mullion (see page 15) is extensively used; the broader mullion line gives a pleasing effect to panels of sash.

SASH AND GLASS SIZES

As shown on page 12, Lupton Steel Sash are made to take glass sizes from 10 inches to 16 inches wide and from 16 inches to 20 inches high, including fractional sizes of one-half inches. We recommend that sash should be laid out to take standard glass sizes. Table on page 12 gives sash measurements with sections 108 and 101 separately and combined, based on different glass size; page 13 shows deduction to be made from the sash size to ascertain wall opening size, space required by standard and Tee mullion, and method of figuring sash dimensions from glass sizes. Directions for stacking, erecting and glazing are given on page 14. We furnish list of glass sizes required, but we do not assume responsibility for errors. We suggest that all glass sizes should be re-checked See page 11 for odd sizes in ventilators.

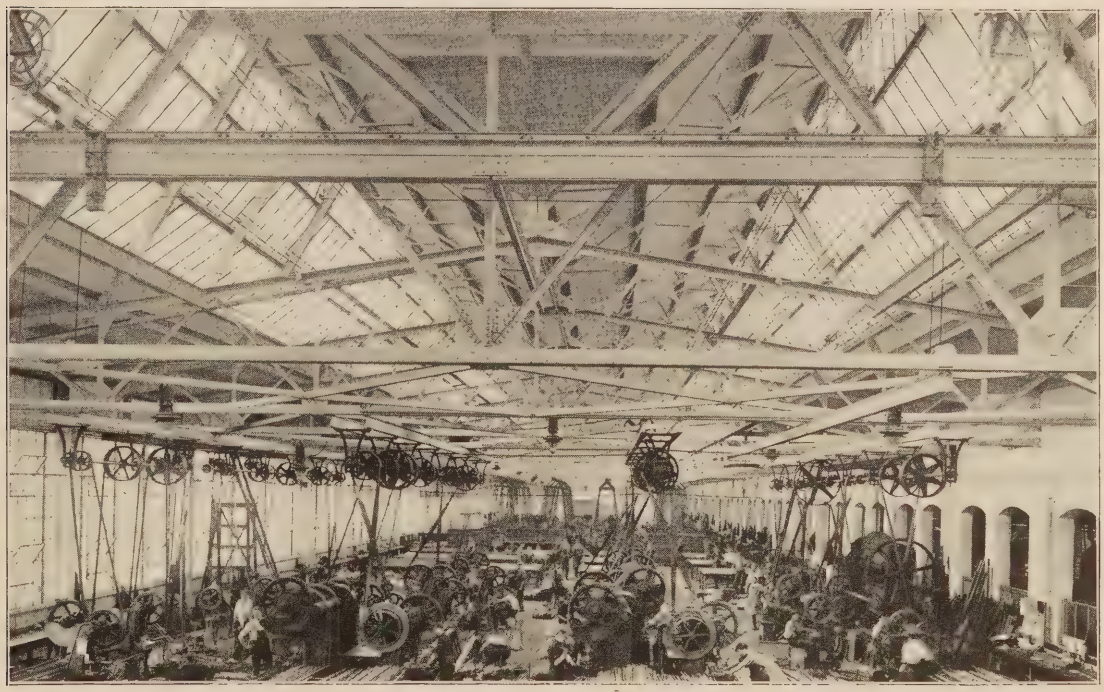
SPECIAL TYPES

With the increased use of steel sash demand arises for specialized types of sash to fill particular requirements of use or to harmonize with the design of certain kinds of buildings. It is a Lupton policy to anticipate such requirements as these, and from the wide variety of the Lupton Steel Sash line we offer types of sash which will meet every practical condition.

Special attention is called to the finer kinds of steel sash, such as Lupton Steel Sash, Packard Type; Projected Ventilator Type for Hospitals; Power House Type; Counterbalanced Type and Counterweighted Type. These types include important and exclusive features, such as oxy-acetylene welded joints, putty concealed by glazing angle frames, attractive finish to both sides of sash, ventilator construction which permits unobstructed use of shades and screens, etc. While the design and construction of these sash are developed in the highest degree, their cost is not excessive, and they are especially economical when maintenance is considered. They are described and illustrated on pages 24 to 37.

SPECIFICATION

For practicability and durability of construction, best results in light and ventilation, and for economical first cost and minimum maintenance, specify Lupton Steel Sash of the desired type.

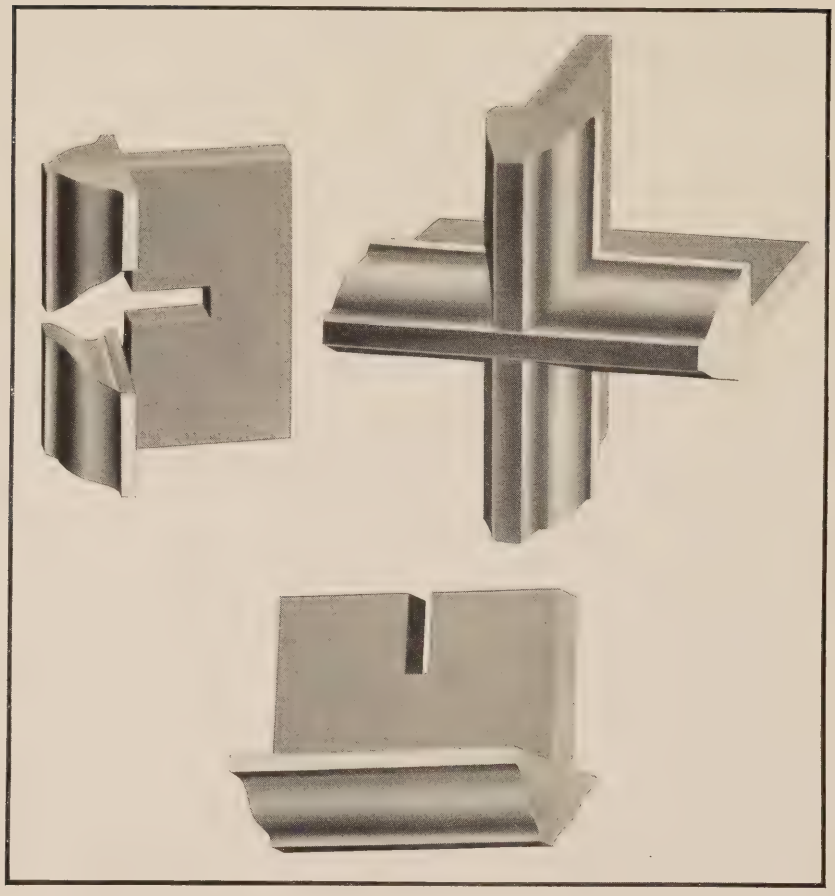


STEEL SASH DEPARTMENT LUPTON FACTORY

Lupton Steel Sash, made to give Daylight, are made in a Daylight Building

Lupton Steel Sash

(Patented, and patents pending)



Lupton Joint

Lupton Joint is made to give greatest strength against direct wind pressure and to afford least opportunity for entrance of moisture and corrosion.

Messrs. Day & Zimmerman
Engineers

Gurney Electric Elevator Company
Honesdale, Pa.

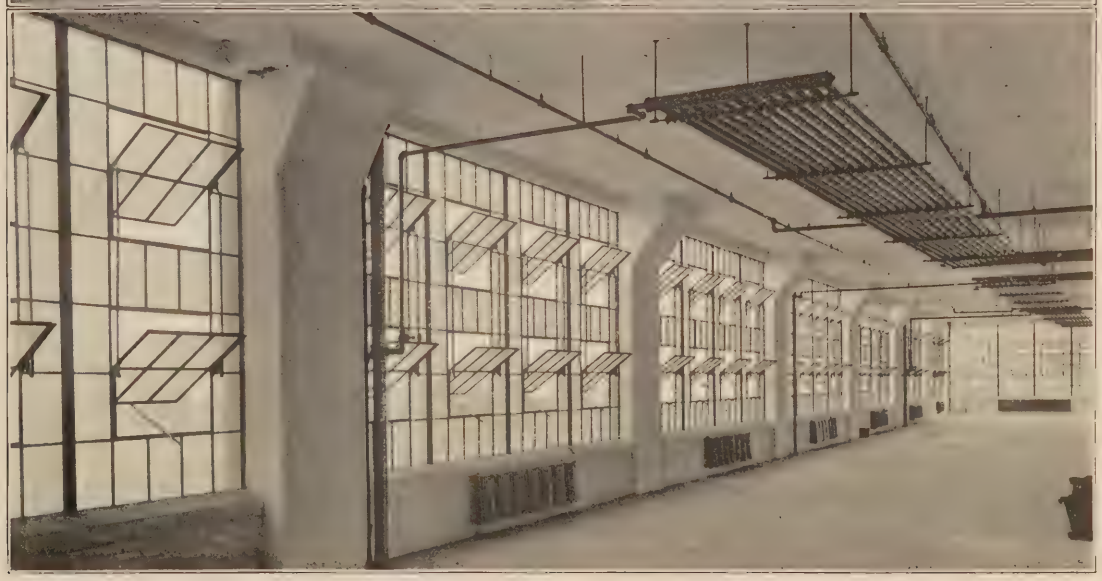
Lupton products are used throughout these buildings—Lupton Steel Sash in side walls and Pond Continuous Sash, controlled by Pond Operating Device, in monitors.

Lupton Steel Sash

N. Snellenburg & Co., Philadelphia, Pa.

Wm. Steele & Sons Company
Engineers and Constructors

Light is evenly distributed throughout this wide building. Tee bar mullions permit adjustment of units for perfect alignment of sash. The double adjustable levers positively control both ventilators and prevent loss of heat.

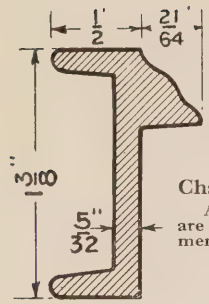


Lupton Steel Sash

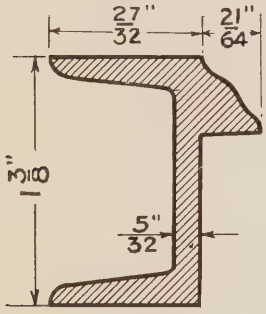
(Patented, and patents pending)

FULL SIZE DETAILS OF SASH MEMBERS

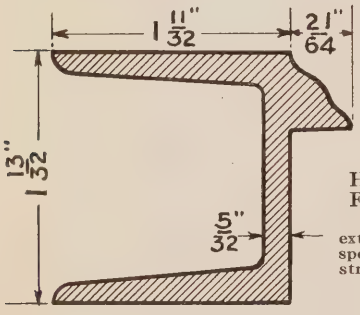
All members are solid, one-piece, rolled steel sections



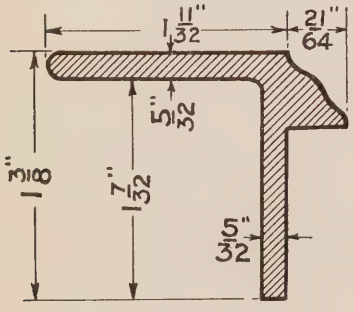
Section 101
Channel Frame Member
All sash sizes given on page 10 are based on the use of this member.

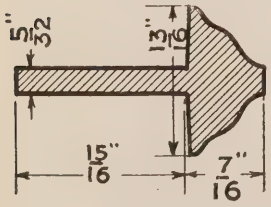


Section 104
Medium Channel Member
Used for sash of large sizes and as frame member occurring against mullions when two ventilators, each the full width of sash, are placed one above the other in each of two or more adjoining sash. See page 13.

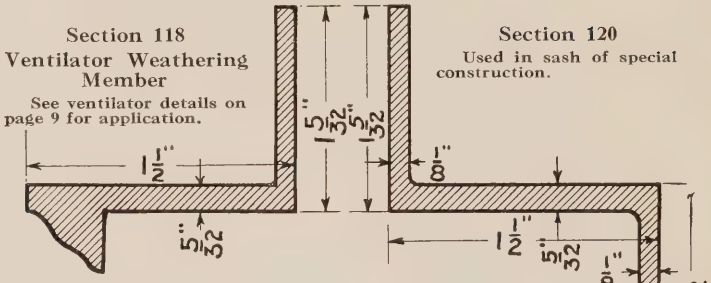


Section 110
Heavy Channel Frame Member
Used for sash of extreme size and for special types and construction.



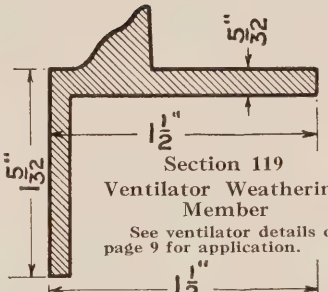


Section 100
Muntin Member



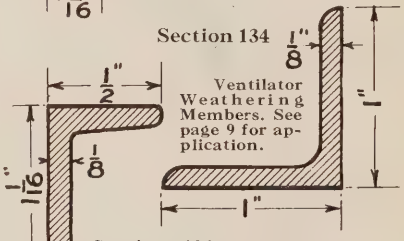
Section 118
Ventilator Weathering Member
See ventilator details on page 9 for application.

Section 120
Used in sash of special construction.

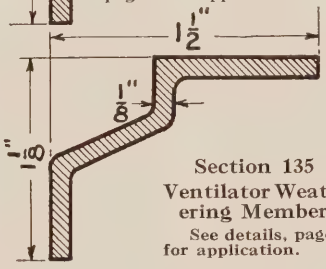


Section 119
Ventilator Weathering Member
See ventilator details on page 9 for application.

Section 122
Member used in glazing frames which conceal putty.

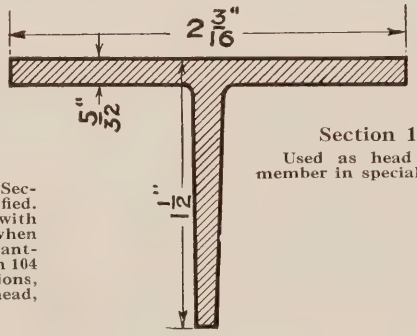


Section 134
Ventilator Weathering Members. See page 9 for application.



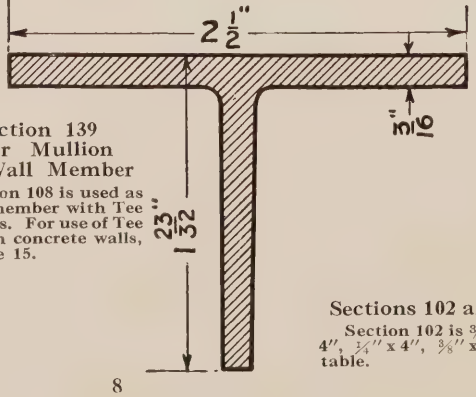
Section 135
Ventilator Weathering Members
See details, page 9 for application.

Section 106



Section 108
Angle Frame Member
Furnished instead of Section 101 when specified. Section 108 is used with T-bar mullions, but when standard mullions are wanted Section 101 or Section 104 is used against the mullions, with Section 108 at head, sill and wall jambs.

Section 121
Used as head and sill member in special types.



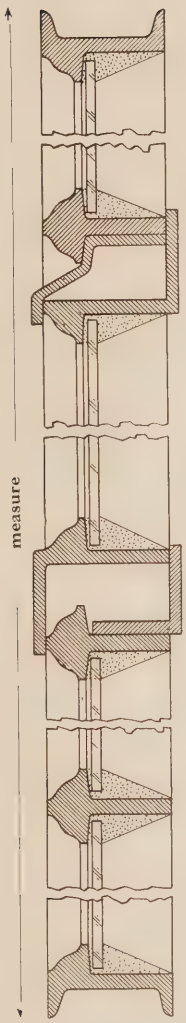
Section 139
T-bar Mullion and Wall Member
Section 108 is used as frame member with Tee mullions. For use of Tee frame in concrete walls, see page 15.

Sections 102 and 116 Standard Mullion
Section 102 is 3/16" x 2 1/2"; Section 116 is 3/16" x 4", 1/4" x 4", 3/8" x 4", 1/2" x 4". See page 13 for table.

Lupton Steel Sash

(Patented, and patents pending)

DETAILS ARE ONE-HALF FULL SIZE



G

Channel frame member, Section 101, at head of sash.

H

Double weathering and drip at top of ventilator.

Note the positive two-point contact or double weathering of ventilator members. The contacts are permanently tight.

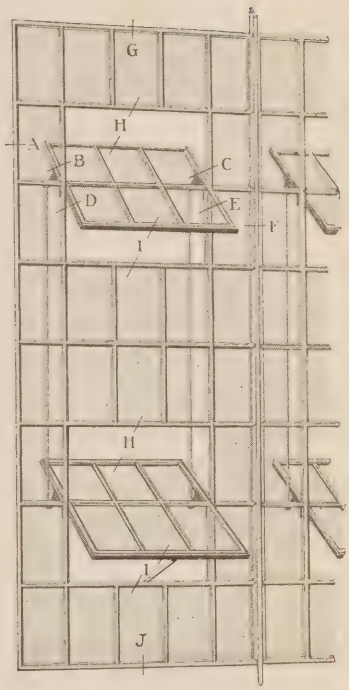
I

Double weathering and drip at bottom of ventilator.

Muntin.

J

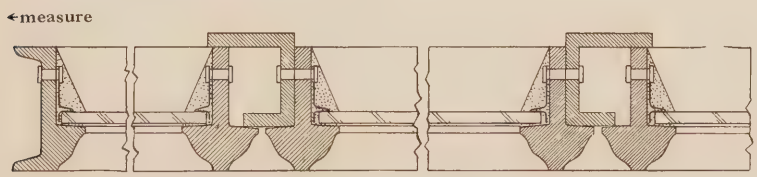
Section 101 at sill.



Typical Lupton Steel Sash

Two arms are used to connect upper and lower ventilators. They are placed at the pivots and assure control of both ventilators in alignment.

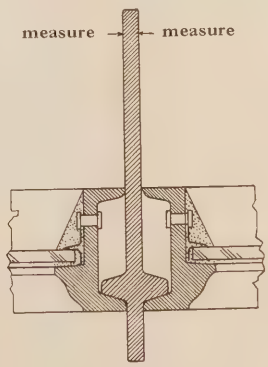
All members are solid one-piece rolled steel sections.



A — Section 101 at wall.

B C — Taken above pivots, showing double weathering at wall jamb.

D E — Taken below pivots, showing double weathering.



F — Showing standard mullion, Section 116, between sash.

Lupton Steel Sash—Standard Units

All dimensions given on this page are sash sizes with channel frame section 101 at head, jambs and sill

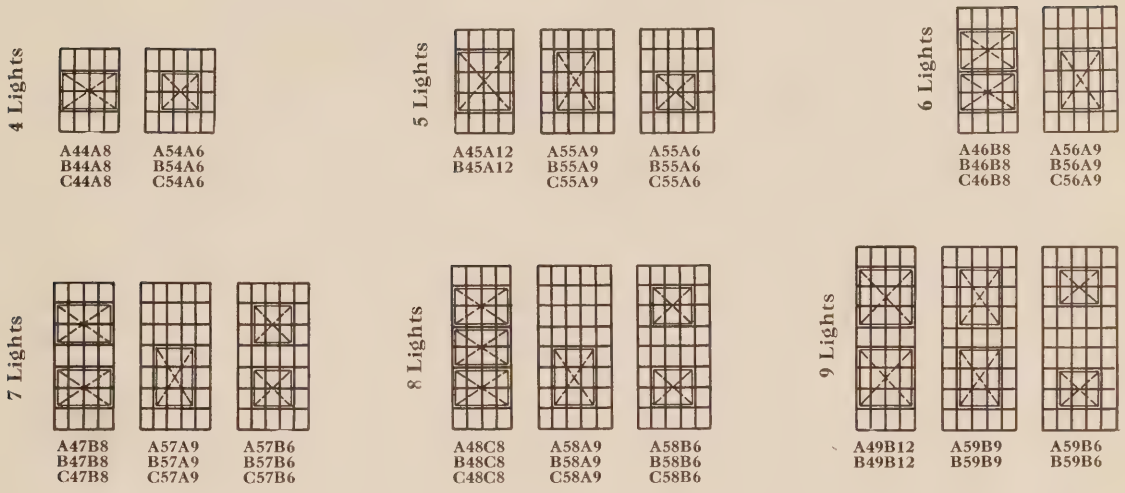
	2	3	4	5	6	7	8	9 Lights
Type A (10″ x 16″)	1′ 9⅝″	2′ 8″	3′ 6⅜″	4′ 4¾″	5′ 3⅛″	6′ 1½″	6′ 11⅞″	7′ 10¼″
Type B (12″ x 18″)	2′ 1⅝″	3′ 2″	4′ 2⅜″	5′ 2¾″	6′ 3⅛″	7′ 3½″	8′ 3⅞″	9′ 4¼″
Type C (14″ x 20″)	2′ 5⅝″	3′ 8″	4′ 10⅜″	6′ 0¾″	7′ 3⅛″			
2 — 2′ 9⅝″ / 3′ 1⅝″ / 3′ 5⅝″	A 22 B 22 C 22	A 32 B 32 C 32	A 42 B 42 C 42	A 52 B 52 C 52	A 62 B 62 C 62	A 72 B 72	A 82 B 82	A 92 B 92
3 — 4′ 2″ / 4′ 8″ / 5′ 2″	A 23 B 23 C 23	A 33 B 33 C 33	A 43 B 43 C 43	A 53 B 53 C 53	A 63 B 63 C 63	A 73 B 73	A 83 B 83	A 93 B 93
4 — 5′ 6¾″ / 6′ 2¾″ / 6′ 10¾″	A 24 B 24 C 24	A 34 B 34 C 34	A 44 B 44 C 44	A 54 B 54 C 54	A 64 B 64 C 64	A 74 B 74	A 84 B 84	A 94 B 94
5 — 6′ 10¾″ / 7′ 8¾″ / 8′ 6¾″	A 25 B 25 C 25	A 35 B 35 C 35	A 45 B 45 C 45	A 55 B 55 C 55	A 65 B 65 C 65	A 75 B 75	A 85 B 85	A 95
6 — 8′ 3⅛″ / 9′ 3⅛″ / 10′ 3⅛″	A 26 B 26 C 26	A 36 B 36 C 36	A 46 B 46 C 46	A 56 B 56 C 56	A 66 B 66 C 66	A 76 B 76	A 86	A 96
7 — 9′ 7½″ / 10′ 9½″ / 11′ 11½″	A 27 B 27 C 27	A 37 B 37 C 37	A 47 B 47 C 47	A 57 B 57 C 57	A 67 B 67 C 67	A 77 B 77	A 87	
8 — 10′ 11⅞″ / 12′ 3⅞″ / 13′ 7⅞″	A 28 B 28 C 28	A 38 B 38 C 38	A 48 B 48 C 48	A 58 B 58 C 58	A 68 B 68	A 78 B 78		
9 Lights — 12′ 4¼″ / 13′ 10¼″ — Type A (10″ x 16″) / Type B (12″ x 18″) / Type C (14″ x 20″)	A 29 B 29	A 39 B 39	A 49 B 49	A 59 B 59	A 69 B 69			

See page 11 for explanation of stock numbers

See page 12 for dimensions of sash with other frame members. No single sash should contain an area greater than 70 square feet; large sizes are unwieldly and difficult to erect. Sash containing ventilators should not be larger than the units shown on the left of the red line. Sash units shown on the right of the red line, when used, should be stationary. See page 11 for recommended use of ventilated sash.

Lupton Steel Sash

Arrangement of Ventilators



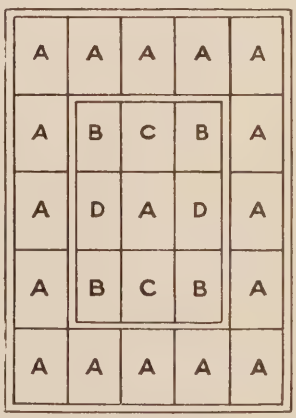
For sash dimensions, see pages 10 and 12

For maximum efficiency in sash construction we recommend the combinations of sash and ventilators shown above. These ventilated sash may be used in connection with larger stationary sash as desired. Ventilators should not exceed 5 feet in width or 5 feet in height nor contain an area exceeding 18 square feet. Location of ventilators should be clearly stated when ordering sash. Where two or more ventilators occur in a sash they are connected by double arms which operate all ventilators in unison and prevent glass breakage.

EXPLANATION OF STOCK NUMBERS

In the stock numbers given above the first letter gives the glass size; as, A indicates 10 by 16 inch lights, B indicates 12 by 18 inch lights, and C indicates 14 by 20 inch lights. When glass sizes other than these are wanted use the letter O and give required glass size immediately after the complete stock number. The first of the two numerals following the glass size letter gives the number of lights in width and the second the number of lights in height contained in the sash. For example: A59 indicates a sash unit taking 10 by 16 inch glass, five lights wide and nine lights high, without ventilation. The letter following the numerals shows how many ventilators are in the sash—A calls for one ventilator, B for two, C for three. The numeral following any of these letters indicates the number of lights in each ventilator. Thus Type B58A9 is a sash five lights wide by eight lights high, taking 12 by 18 inch glass, equipped with one ventilator of nine lights. If two ventilators of six lights each were required Type B58B6 would be used. Type O48C8 (12 by 20 inches) describes a sash four lights wide by eight lights high, taking 12 by 20 inch glass and equipped with three ventilators of eight lights each. The location of the ventilators in the sash should always be stated. See page 12 for over-all sizes of standard sash units taking different glass sizes.

GLASS SIZES IN VENTILATORS



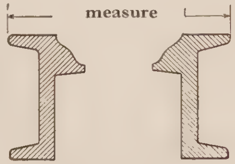
The glass in the top and bottom rows of lights occurring in ventilators are ⅞ inch shorter, and the two side rows of lights are ⅞ inch narrower than other lights in a sash. Internal lights in ventilator are the same size as those in sash. The reduction in size of border lights is due to space taken up by weathering members around ventilator (see details page 9). The four corner lights in a ventilator will be ⅞ inch less in both height and width, while other border lights will be reduced ⅞ inch in one dimension only—either in height or width, according to their location. In the illustration lights of one size have a common letter; thus in a nine-light ventilator there is one light A the same size as in the stationary part of sash, the four corner lights B are reduced in both dimensions, the lights C ⅞ inch less in height and the lights D ⅞ inch less in width. This applies to ventilators of any size.

From
Lombard & Tracy Co.
Sales Agents
161 Devonshire Street

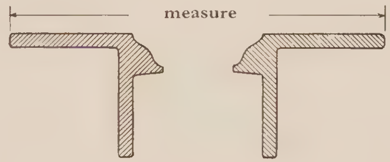
Tables Giving Widths and Heights of Lupton Steel Sash Units

USE SASH TAKING STANDARD GLASS SIZES An important saving in cost of Steel Sash can be effected by using sash made to take standard glass sizes. Lights not standard are priced at the next larger standard size. You pay for more glass than you get and also for the cost of trimming each light to required size. The wide variety of standard glass sizes makes the use of special sizes unnecessary.

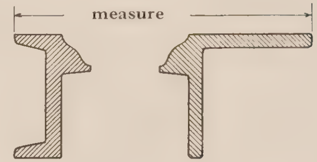
EXPLANATION OF TABLES The dimensions for widths and heights given under the headings "101" are based on this section being used at both jambs or at head and sill of a sash. Under the headings "108" the measurements are based on the similar use of Section 108. The headings "101 and 108" refer to the use of these two sections, one at one jamb and the other at the opposite jamb, or one at the head and the other at the sill.



Section 101



Section 108



Sections 101 and 108

NOTE MEASURING POINTS

WIDTHS OF SINGLE SASH UNITS

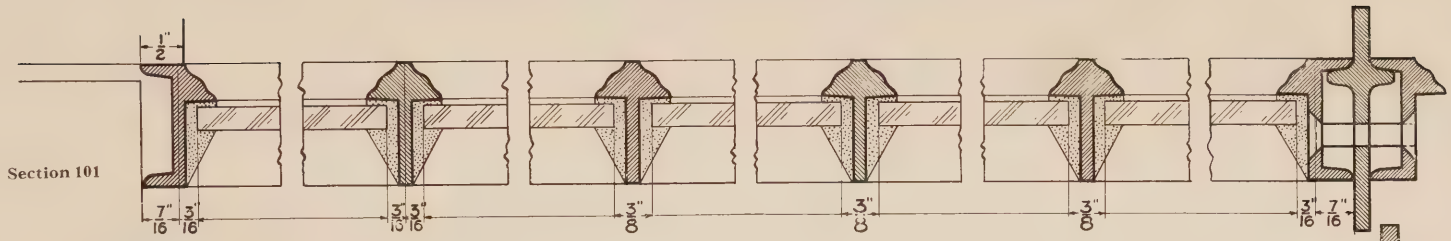
Width Per Light	1 Sash 2 Lights Wide			3 Lights Wide			4 Lights Wide			5 Lights Wide			6 Lights Wide			7 Lights Wide			8 Lights Wide			9 Lights Wide		
	101	108	101 & 108	101	108	101 & 108	101	108	101 & 108	101	108	101 & 108	101	108	101 & 108	101	108	101 & 108	101	108	101 & 108	101	108	101 & 108
10"	1' 9⅝"	1'11⅜"	1'10½"	2' 8"	2' 9¾"	2' 8⅞"	3' 6⅜"	3' 8⅛"	3' 7¼"	4' 4¾"	4' 6½"	4' 5⅝"	5' 3⅛"	5' 4⅞"	5' 4"	6' 1½"	6' 3¼"	6' 2⅜"	6'11⅞"	7' 1⅝"	7' 0¾"	7'10¼"	8' 0"	7'11⅛"
10½"	1'10⅝"	2' 0⅜"	1'11½"	2' 9½"	2'11¼"	2'10⅜"	3' 8⅜"	3'10⅛"	3' 9¼"	4' 7¼"	4' 9"	4' 8⅛"	5' 6⅛"	5' 7⅞"	5' 7"	6' 5"	6' 6¾"	6' 5⅞"	7' 3⅞"	7' 5⅝"	7' 4¾"	8' 2¾"	8' 4½"	8' 3⅝"
11"	1'11⅝"	2' 1⅜"	2' 0½"	2'11"	3' 0¾"	2'11⅞"	3'10⅜"	4' 0⅛"	3'11¼"	4' 9¾"	4'11½"	4'10⅝"	5' 9⅛"	5'10⅞"	5'10"	6' 8½"	6'10¼"	6' 9⅜"	7' 7⅞"	7' 9⅝"	7' 8¾"	8' 7¼"	8' 9"	8' 8⅛"
11½"	2' 0⅝"	2' 2⅜"	2' 1½"	3' 0½"	3' 2¼"	3' 1⅜"	4' 0⅜"	4' 2⅛"	4' 1¼"	5' 0¼"	5' 2"	5' 1⅛"	6' 0⅛"	6' 1⅞"	6' 1"	7' 0"	7' 1¾"	7' 0⅞"	7'11⅞"	8' 1⅝"	8' 0¾"	8'11¾"	9' 1½"	9' 0⅝"
12"	2' 1⅝"	2' 3⅜"	2' 2½"	3' 2"	3' 3¾"	3' 2⅞"	4' 2⅜"	4' 4⅛"	4' 3¼"	5' 2¾"	5' 4½"	5' 3⅝"	6' 3⅛"	6' 4⅞"	6' 4"	7' 3½"	7' 5¼"	7' 4⅜"	8' 3⅞"	8' 5⅝"	8' 4¾"	9' 4¼"	9' 6"	9' 5⅛"
12½"	2' 2⅝"	2' 4⅜"	2' 3½"	3' 3½"	3' 5¼"	3' 4⅜"	4' 4⅜"	4' 6⅛"	4' 5¼"	5' 5¼"	5' 7"	5' 6⅛"	6' 6⅛"	6' 7⅞"	6' 7"	7' 7"	7' 8¾"	7' 7⅞"	8' 7⅞"	8' 9⅝"	8' 8¾"			
13"	2' 3⅝"	2' 5⅜"	2' 4½"	3' 5"	3' 6¾"	3' 5⅞"	4' 6⅜"	4' 8⅛"	4' 7¼"	5' 7¾"	5' 9½"	5' 8⅝"	6' 9⅛"	6'10⅞"	6'10"	7'10½"	8' 0¼"	7'11⅜"						
13½"	2' 4⅝"	2' 6⅜"	2' 5½"	3' 6½"	3' 8¼"	3' 7⅜"	4' 8⅜"	4'10⅛"	4' 9¼"	5'10¼"	6' 0"	5'11⅛"	7' 0⅛"	7' 1⅞"	7' 1"									
14"	2' 5⅝"	2' 7⅜"	2' 6½"	3' 8"	3' 9¾"	3' 8⅞"	4'10⅜"	5' 0⅛"	4'11¼"	6' 0¾"	6' 2½"	6' 1⅝"	7' 3⅛"	7' 4⅞"	7' 4"									

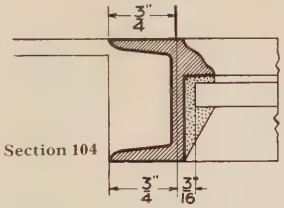
HEIGHTS OF SINGLE SASH UNITS

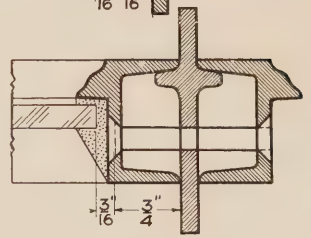
Height Per Light	1 Sash 2 Lights High			3 Lights High			4 Lights High			5 Lights High			6 Lights High			7 Lights High			8 Lights High			9 Lights High		
	101	108	101 & 108	101	108	101 & 108	101	108	101 & 108	101	108	101 & 108	101	108	101 & 108	101	108	101 & 108	101	108	101 & 108	101	108	101 & 108
16"	2' 9⅝"	2'11⅜"	2'10½"	4' 2"	4' 3¾"	4' 2⅞"	5' 6⅜"	5' 8⅛"	5' 7¼"	6'10¾"	7' 0½"	6'11⅝"	8' 3⅛"	8' 4⅞"	8' 4"	9' 7½"	9' 9¼"	9' 8⅜"	10'11⅞"	11' 1⅝"	11' 0¾"	12' 4¼"	12' 6"	12' 5⅛"
16½"	2'10⅝"	3' 0⅜"	2'11½"	4' 3½"	4' 5¼"	4' 4⅜"	5' 8⅜"	5'10⅛"	5' 9¼"	7' 1¼"	7' 3"	7' 2⅛"	8' 6⅛"	8' 7⅞"	8' 7"	9'11"	10' 0¾"	9'11⅞"	11' 3⅞"	11' 5⅝"	11' 4¾"	12' 8¾"	12'10½"	12' 9⅝"
17"	2'11⅝"	3' 1⅜"	3' 0½"	4' 5"	4' 6¾"	4' 5⅞"	5'10⅜"	6' 0⅛"	5'11¼"	7' 3¾"	7' 5½"	7' 4⅝"	8' 9⅛"	8'10⅞"	8'10"	10' 2½"	10' 4¼"	10' 3⅜"	11' 7⅞"	11' 9⅝"	11' 8¾"	13' 1¼"	13' 3"	13' 2⅛"
17½"	3' 0⅝"	3' 2⅜"	3' 1½"	4' 6½"	4' 8¼"	4' 7⅜"	6' 0⅜"	6' 2⅛"	6' 1¼"	7' 6¼"	7' 8"	7' 7⅛"	9' 0⅛"	9' 1⅞"	9' 1"	10' 6"	10' 7¾"	10' 6⅞"	11'11⅞"	12' 1⅝"	12' 0¾"	13' 5¾"	13' 7½"	13' 6⅝"
18"	3' 1⅝"	3' 3⅜"	3' 2½"	4' 8"	4' 9¾"	4' 8⅞"	6' 2⅜"	6' 4⅛"	6' 3¼"	7' 8¾"	7'10½"	7' 9⅝"	9' 3⅛"	9' 4⅞"	9' 4"	10' 9½"	10'11¼"	10'10⅜"	12' 3⅞"	12' 5⅝"	12' 4¾"	13'10¼"	14' 0"	13'11⅛"
18½"	3' 2⅝"	3' 4⅜"	3' 3½"	4' 9½"	4'11¼"	4'10⅜"	6' 4⅜"	6' 6⅛"	6' 5¼"	7'11¼"	8' 1"	8' 0⅛"	9' 6⅛"	9' 7⅞"	9' 7"	11' 1"	11' 2¾"	11' 1⅞"	12' 7⅞"	12' 9⅝"	12' 8¾"			
19"	3' 3⅝"	3' 5⅜"	3' 4½"	4'11"	5' 0¾"	4'11⅞"	6' 6⅜"	6' 8⅛"	6' 7¼"	8' 1¾"	8' 3½"	8' 2⅝"	9' 9⅛"	9'10⅞"	9'10"	11' 4½"	11' 6¼"	11' 5⅜"	12'11⅞"	13' 1⅝"	13' 0¾"			
19½"	3' 4⅝"	3' 6⅜"	3' 5½"	5' 0½"	5' 2¼"	5' 1⅜"	6' 8⅜"	6'10⅛"	6' 9¼"	8' 4¼"	8' 6"	8' 5⅛"	10' 0⅛"	10' 1⅞"	10' 1"	11' 8"	11' 9¾"	11' 8⅞"	13' 3⅞"	13' 5⅝"	13' 4¾"			
20"	3' 5⅝"	3' 7⅜"	3' 6½"	5' 2"	5' 3¾"	5' 2⅞"	6'10⅜"	7' 0⅛"	6'11¼"	8' 6¾"	8' 8½"	8' 7⅝"	10' 3⅛"	10' 4⅞"	10' 4"	11'11½"	12' 1¼"	12' 0⅜"	13' 7⅞"	13' 9⅝"	13' 8¾"			

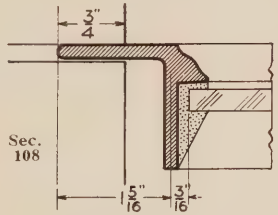
Sash taking 10" x 16", 12" x 18" and 14" x 20" glass are stock sizes.
No Single sash should contain an area greater than 70 square feet.
See page 11 for recommended use of ventilators, and page 10 for limits in sizes of sash containing ventilators.

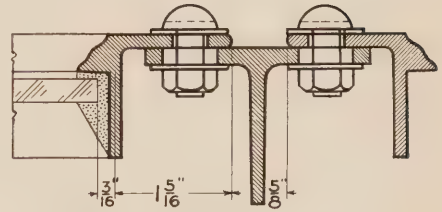
Sash and Wall Opening Sizes







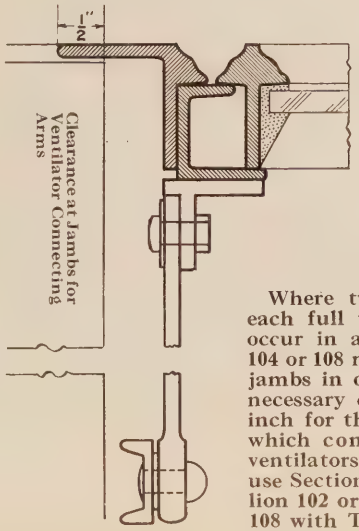




TO COMPUTE SASH HEIGHT OR WIDTH FROM GLASS SIZE

To height or width of each light add 3/8 inch and multiply by number of lights high or wide. To this result add for EACH frame member as follows:

Section No. 101	7/16″
Section No. 104	3/4″
Section No. 108	15/16″
Section No. 110	15/16″



Where two ventilators, each full width of sash, occur in a unit, Section 104 or 108 must be used at jambs in order to obtain necessary clearance of 3/4 inch for the double arms which connect the two ventilators. At mullions use Section 104 with Mullion 102 or 116, or Section 108 with T-Mullion. (See mullion details above.)

TABLE GIVING SIZE OF MULLIONS (SECTIONS 102 AND 116) BETWEEN SASH

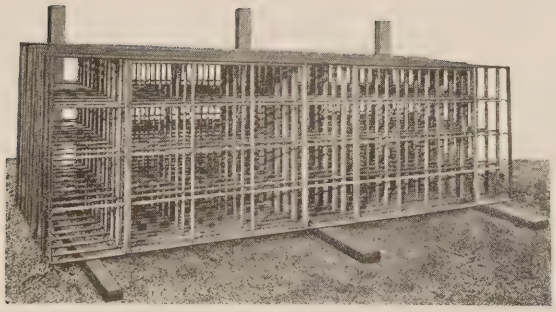
Sash Height	Width each Sash 3′ 0″	4′ 0″	5′ 0″	6′ 0″	7′ 0″
7′ 0″	2½″ x 3/16″	2½″ x 3/16″	2½″ x 3/16″	2½″ x 3/16″	2½″ x 3/16″
8′ 0″	2½″ x 3/16″	2½″ x 3/16″	2½″ x 3/16″	4″ x 3/16″	4″ x 3/16″
9′ 0″	4″ x 3/16″	4″ x 3/16″	4″ x 3/16″	4″ x 3/16″	4″ x 3/16″
10′ 0″	4″ x 3/16″	4″ x 3/16″	4″ x 3/16″	4″ x 1/4″	4″ x 1/4″
11′ 0″	4″ x 3/16″	4″ x 3/16″	4″ x 3/16″	4″ x 1/4″	4″ x 3/8″
12′ 0″	4″ x 3/16″	4″ x 1/4″	4″ x 3/8″	4″ x 3/8″	
13′ 0″	4″ x 3/8″	4″ x 3/8″	4″ x 3/8″		
14′ 0″	4″ x 3/8″	4″ x 3/8″	4″ x 3/8″		

OVER-ALL WIDTH OF SASH UNITS WITH SECTION 101 AND MULLION 116

	TYPE A—10″ x 16″ LIGHTS		TYPE B—12″ x 18″ LIGHTS		TYPE C—14″ x 20″ LIGHTS	
	Four Lights Wide	Five Lights Wide	Four Lights Wide	Five Lights Wide	Four Lights Wide	Five Lights Wide
1 Unit	3′6 3/8″	4′4 3/4″	4′ 2 3/8″	5′ 2 3/4″	4′10 3/8″	6′0 3/4″
2 Units	7′0 15/16″	8′9 11/16″	8′ 4 15/16″	10′ 5 11/16″	9′ 8 15/16″	12′1 11/16″
3 Units	10′7 1/2″	13′2 5/8″	12′ 7 1/2″	15′ 8 5/8″	14′ 7 1/2″	18′2 5/8″
4 Units	14′2 1/16″	17′7 9/16″	16′10 1/16″	20′11 9/16″	19′ 6 1/16″	24′3 9/16″

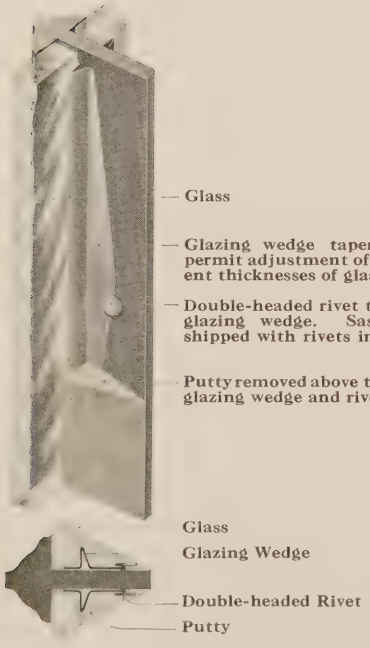
In the above tables 3/16-inch has been allowed for standard Mullion Section 102 or 116 between sash units

Lupton Steel Sash



Correct method of stacking Lupton Steel Sash. Sash should not be laid flat

When blocking up Lupton Steel Sash in window openings, blocks should be placed directly under the jambs only



Lupton Glazing Wedge

General Information

STACKING Lupton Steel Sash should be carefully stacked as soon as received by standing them on edge on three or more level pieces of lumber, such as 3 x 4's, with strongly braced uprights against which the sash may lean. Do not lay sash flat or pile one upon another.

ERECTING Sash should be set and carefully leveled; angles of surrounding walls must be true 90 degrees. In blocking up the sash wedges should be placed only directly under the jambs as shown. Care should be taken that horizontal muntins in each sash are in exact alignment with those in adjoining sash. Clearance should be left at heads and jambs so that ventilators will operate freely.

Ventilators are wired to sash and braced by wood blocks; these should not be removed until the sash are completely set. When two ventilators occur in a sash the arms connecting them must be attached and adjusted after the sash are set.

Lintels over sash must carry walls without deflecting any part of their load on the sash.

GLAZING Lupton Steel Sash are glazed after being built in the walls; the work is done from the inside of the building. Glass is held in place by the special Lupton glazing wedges being forced down until the flat surface of the wedge engages the glass and the sloped edge fits tightly against the double-headed rivet. Only two wedges are required for each light, one on each side. The wedges give a flat bearing of 3½ inches against the glass, holding each light firmly in place, but preventing breakage from expansion; the sloped edge makes the wedge self-adjusting to varying thicknesses of glass. The double-headed rivets are placed in the sash at the factory. As no special tool is required for the wedges, and as only two are used for each light, the glazing cost of Lupton Steel Sash is reduced to the minimum.

Glass should be back puttied and struck off flush with the sash member. Putty is also applied on the inside, beveled back from the glass to the edge of the sash member.

Ordinary grades of putty do not give good results in glazing steel sash. For best results we recommend Lupton Special Putty, which makes a permanent bond between the glass and steel.

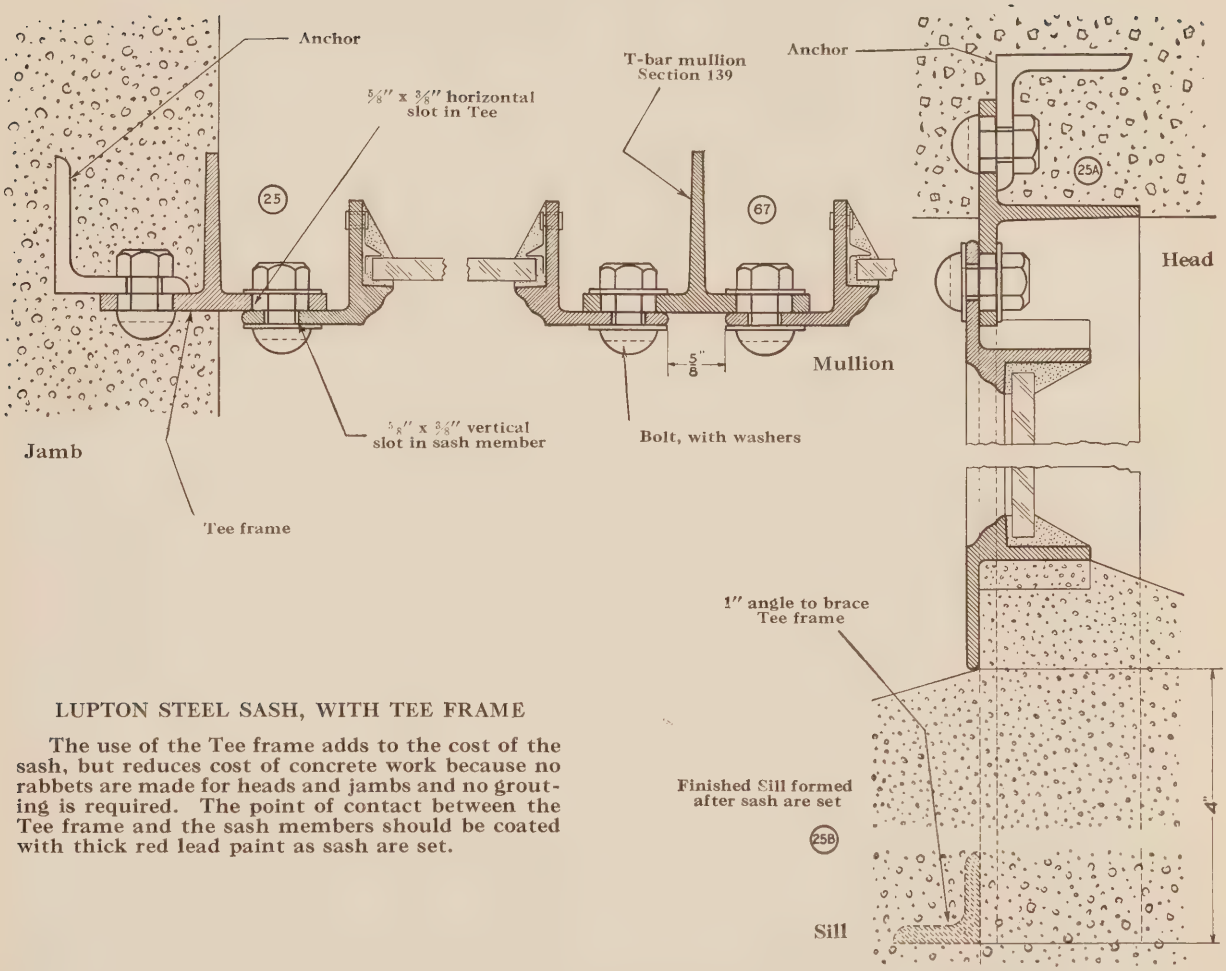
When ordering glass it should be noted that the top and bottom rows of lights occurring in ventilators are smaller than lights elsewhere in sash. See page 11. We furnish list of glass sizes when required, but we do not assume responsibility for errors. All lists should be carefully re-checked.

FITTINGS Lupton Steel Sash are given a thorough coat of paint at the factory, and are shipped with complete standard hardware, including pivots and peg stays for ventilators. Lupton Glazing Wedges and necessary wall-ties are furnished in sufficient number. Standard mullions and mullion bolts are included when required. T-bar mullions, when wanted, should be specified. We do not furnish expansion bolts.

ORDERS When ordering Lupton Steel Sash use correct stock numbers; specify frame-member wanted and location of ventilators. If mullions are required, state whether standard or T-bar mullions are wanted. In order that suitable wall-ties may be sent, use encircled descriptive numbers accompanying details on pages following, or send sketches showing jambs, lintels, and sills.

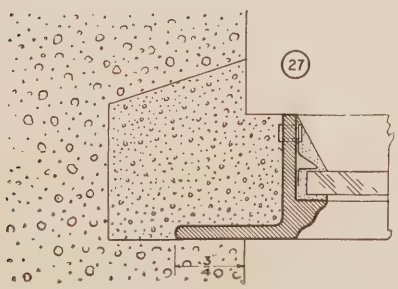
Lupton Steel Sash
In Concrete Walls

DETAILS ARE ONE-HALF FULL SIZE

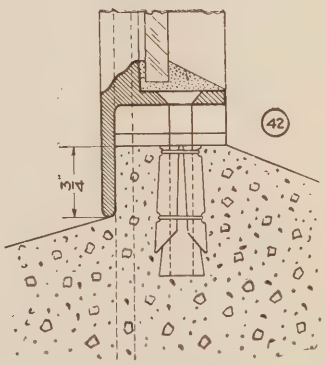


LUPTON STEEL SASH, WITH TEE FRAME

The use of the Tee frame adds to the cost of the sash, but reduces cost of concrete work because no rabbets are made for heads and jambs and no grouting is required. The point of contact between the Tee frame and the sash members should be coated with thick red lead paint as sash are set.



Section at Head or Jamb
Groove left in concrete of lintel or jamb to receive sash and grouted after sash are set.

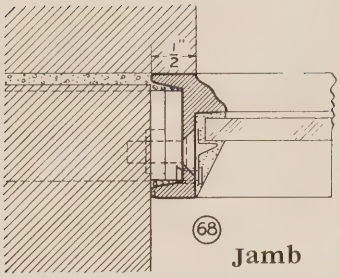


Section at Sill
Sash set on concrete sill and fastened by expansion bolts. Sash may be blocked up on rough wall and sill formed under sash.

When ordering sash give numbers (in circles) descriptive of required wall and lintel conditions. We do not furnish expansion bolts.

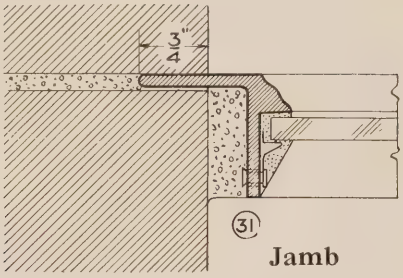
Lupton Steel Sash
In Brick Walls

DETAILS ARE ONE-HALF FULL SIZE



Jamb

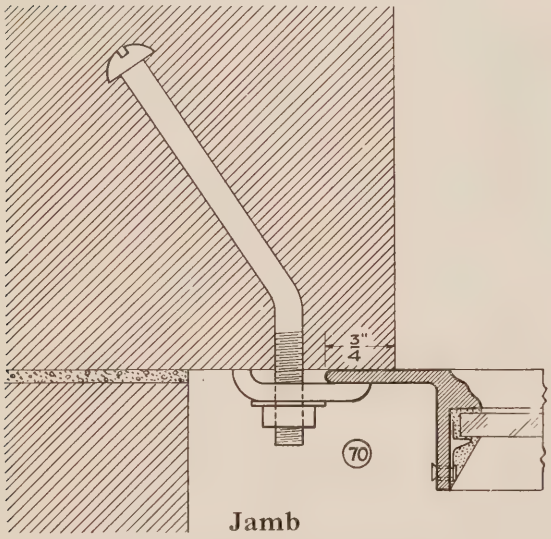
Showing method of building in sash with 101 frame member. Brick are offset to form reveal. Sash are provided with wall ties which are built in brick joints. Space between sash member and brick is filled with mortar.



Jamb

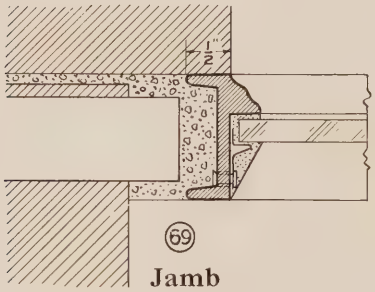
Showing method of building in sash with 108 frame member. Leg of member is built in joint of brick work.

Clearance of three-quarters inch should be left if ventilators extend full width of sash. (See page 13.)



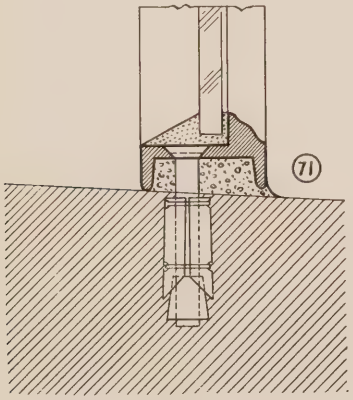
Jamb

Bolts are built in brick work with threaded ends projecting from reveal. Sash are set in finished wall and are held by clips secured to bolt ends. Bolts should be spaced about eighteen inches apart.



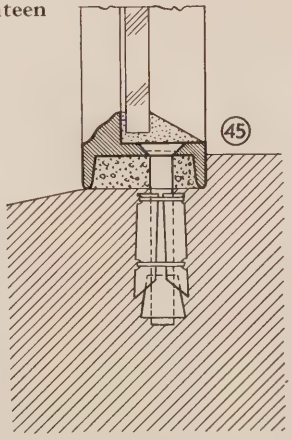
Jamb

Reveal left in brick work to receive sash, which are set in completed wall. Ties are built in to make key for concrete grouting.



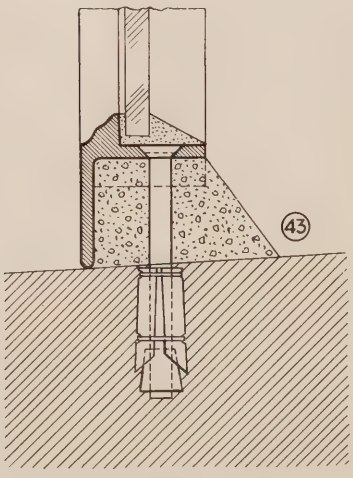
Sill

Brick on edge, stone or cement sills with Section 101 as frame member.



Sill

Section 101 on stone sill.



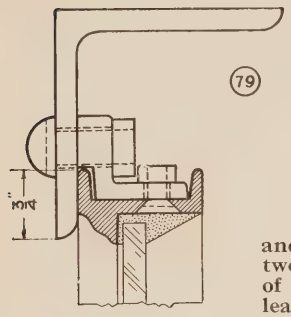
Sill

Sash with Section 108 at sill.

When ordering sash give numbers (in circles) descriptive of required wall and lintel conditions.
We do not furnish expansion bolts.

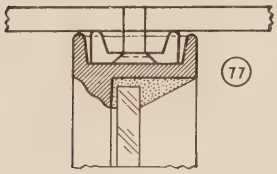
Lupton Steel Sash
In Steel Framing

DETAILS ARE ONE-HALF FULL SIZE



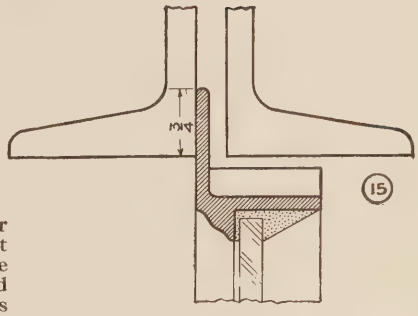
Head or Jamb

Sash with Section 101 as frame member secured to angle by clips.



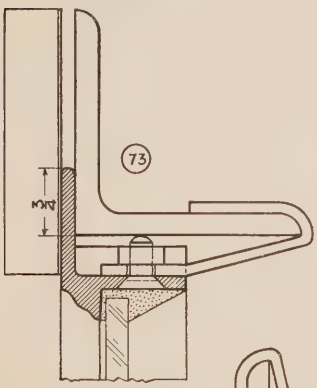
Head or Sill

3/8" x 1" channel furnished by steel contractor and secured to lintel plate. Channel must be cut two inches less than width of sash for clearance of jamb members. Where mullions are used leave additional clearance required by thickness of mullion. On request we will send complete details showing how channel should be spaced for sash of any width.

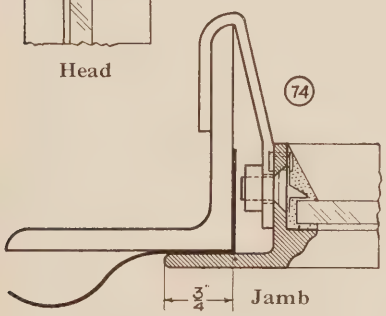


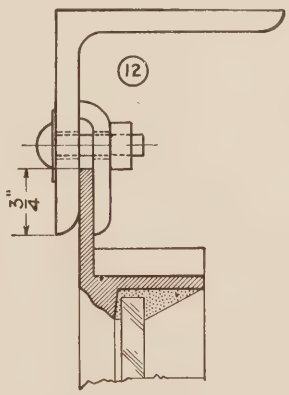
Head

Section 108 set between channel lintel or angle.



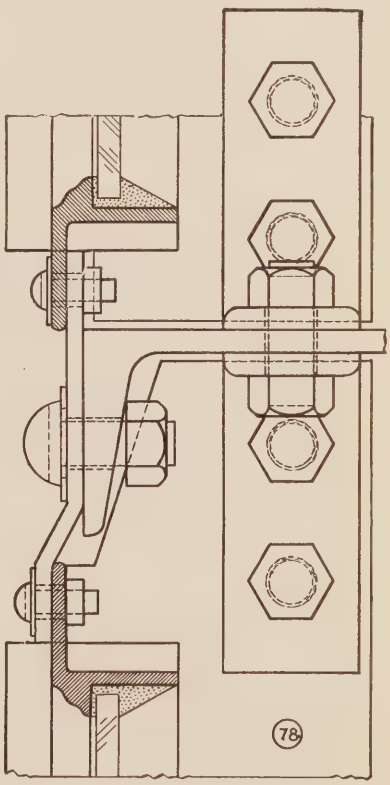
Head





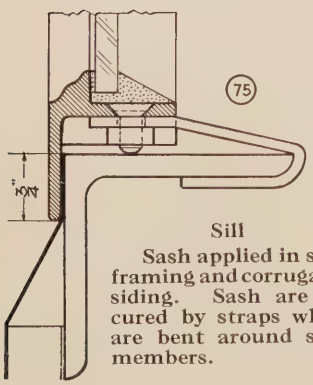
Head

Sash with Section 108 secured to angle lintel by clips. Angle should be punched for 9/16" hole. No matching of holes is necessary.



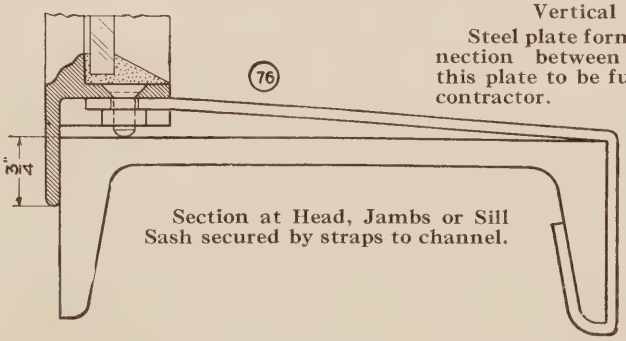
Vertical Section

Steel plate forming impost connection between sash. Specify this plate to be furnished by steel contractor.



Sill

Sash applied in steel framing and corrugated siding. Sash are secured by straps which are bent around steel members.



Section at Head, Jambs or Sill
Sash secured by straps to channel.

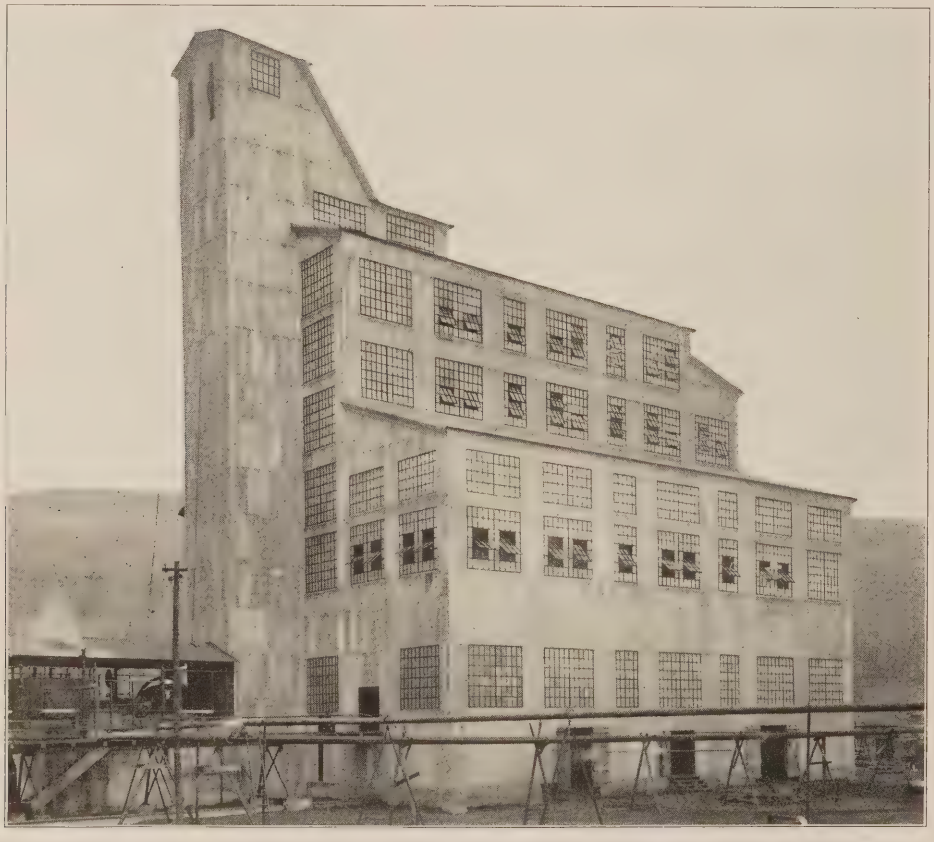
When ordering sash give numbers (in circles) descriptive of required wall and lintel conditions.

Lupton Steel Sash

Mr. William Wallace Christie
Architect

Estate of Benjamin Eastwood
Paterson, N. J.

Lupton Steel Sash equipped with double ventilators. These large panels of sash set close to ceiling throw the light into center of building.

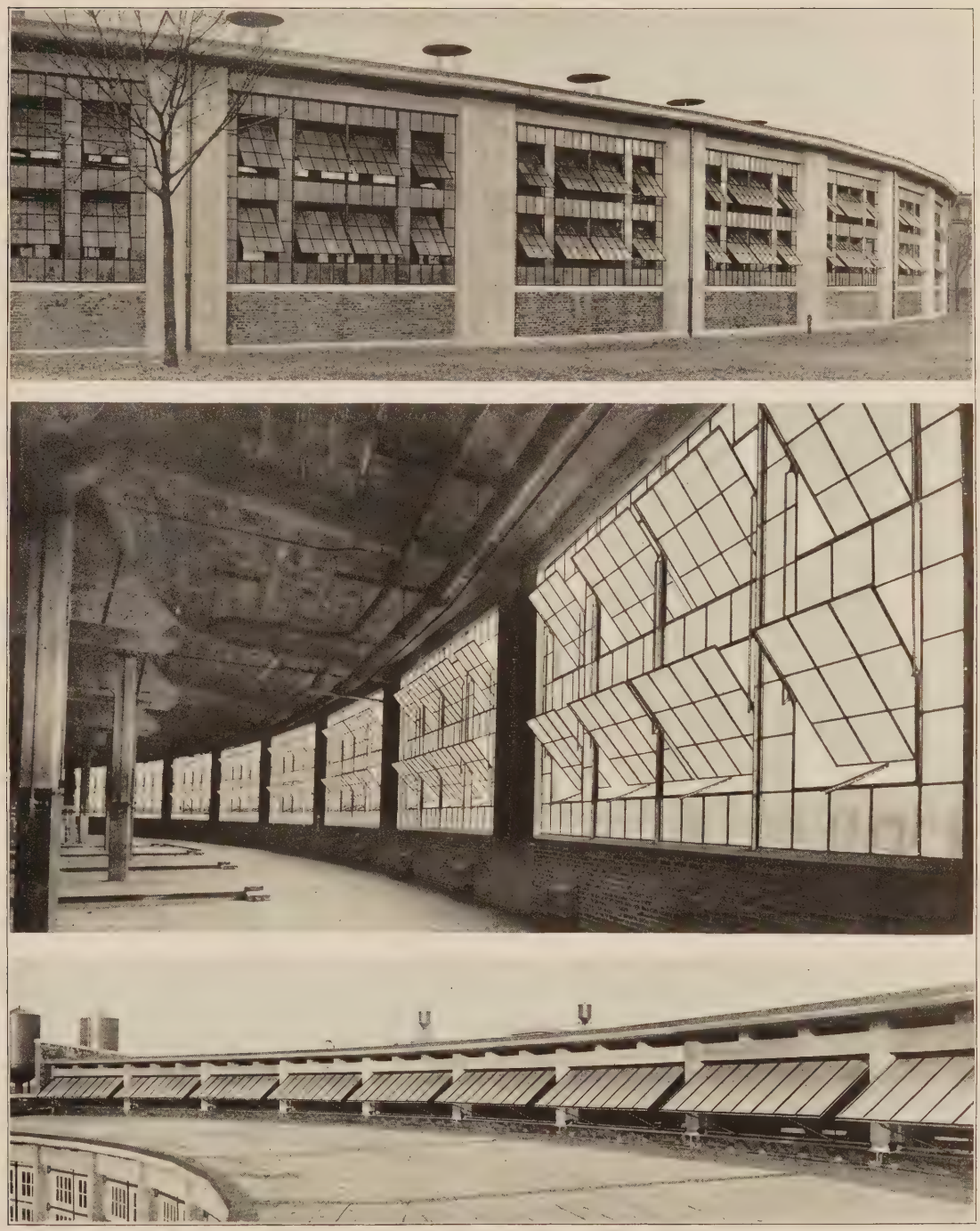


Mr. Paul Sterling
Mechanical Engineer

Lehigh Valley Coal Company, Franklin Breaker
Wilkes-Barre, Pa.

Lupton Steel Sash successfully stand the severe conditions of high wind pressure, constant vibration and rough usage existing in coal breakers. Ask for our special coal breaker details, showing application of Lupton Steel Sash to structural work and approved methods of attaching.

Lupton Steel Sash

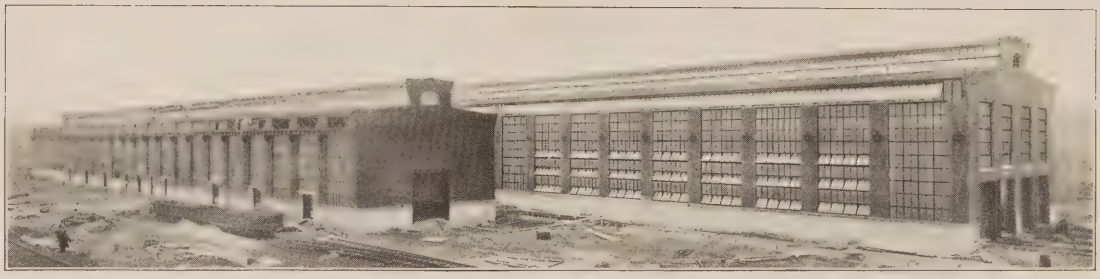


Westinghouse Church Kerr Company
Engineers and Constructors

Central Railroad of New Jersey Roundhouse
Communipaw, N. J.

Lupton Steel Sash in side walls of roundhouse. Panels of Pond Continuous Sash controlled by Pond Operating Device are used in roof. Roundhouses thus equipped with Lupton Products are always kept free of gases.

Lupton Steel Sash



Mr. Clark Dillenbeck
Chief Engineer

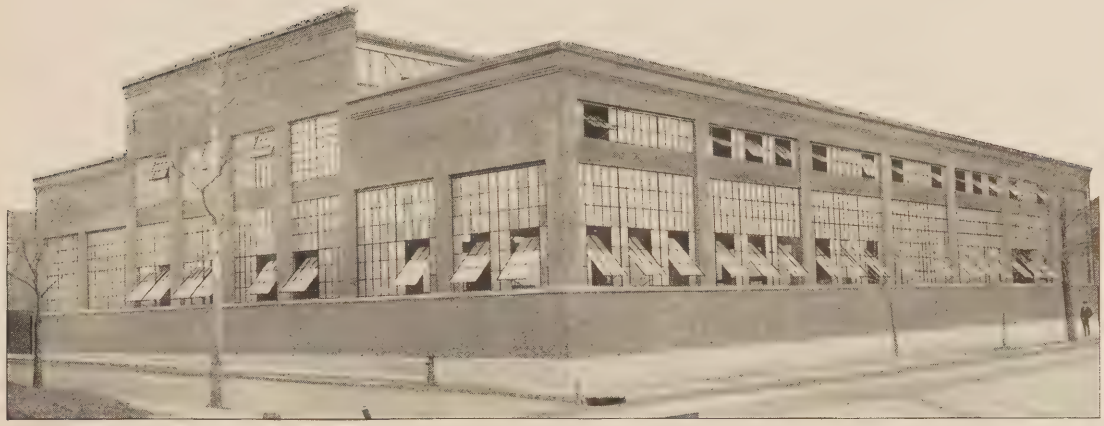
Philadelphia & Reading Railway Company Shops
St. Clair, Pa.

Large panels of Lupton Steel Sash in side walls, with Pond Continuous Sash at eaves and in monitors. All sash are controlled by Pond Operating Device.

No horizontal muntins were used in the Lupton Steel Sash in these buildings. All ventilators in an opening are connected by double arms and are operated together by Pond Operating Device.

Lupton Products are extensively used in Railway Shop Buildings. Refer to page 84 for recent installations.

Lupton Steel Sash



Messrs. McCormick & French
Architects

Wilkes-Barre Iron Manufacturing Company
Wilkes-Barre, Pa.

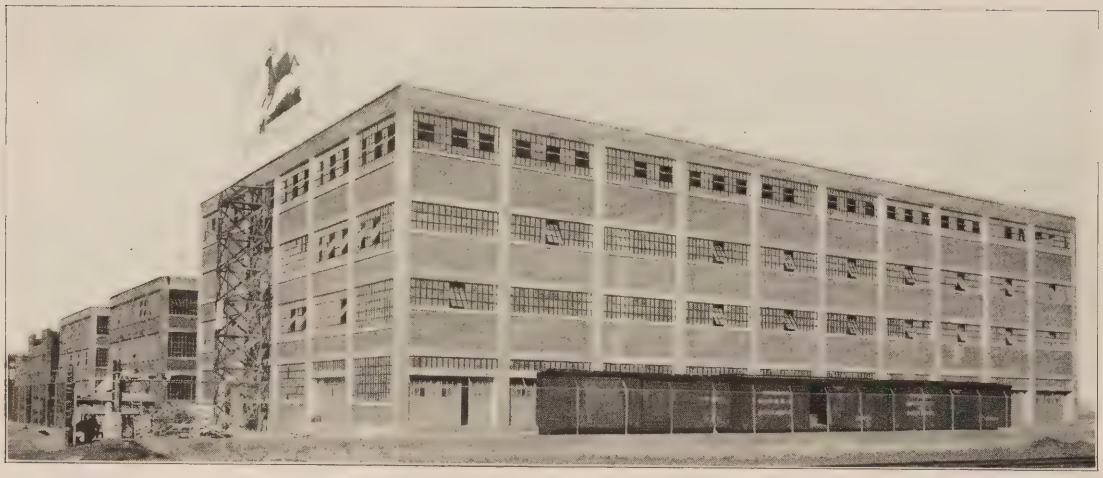
An effective arrangement of Lupton Steel Sash in side wall panels and Pond Continuous Sash controlled by Pond Operating Device in monitor. We will be pleased to submit photographs of small shop buildings economically lighted and ventilated by Lupton products.

Messrs. Rutan & Russell
Architects

Jas. H. Matthews & Co.
Pittsburgh, Pa.

Lupton Steel Sash with upper ventilators pivoted at centers; lower ventilators are hinged at top to afford weather protection to workers at benches, which are placed at walls. The large lights of glass and absence of horizontal muntins add to the attractiveness of the sash.

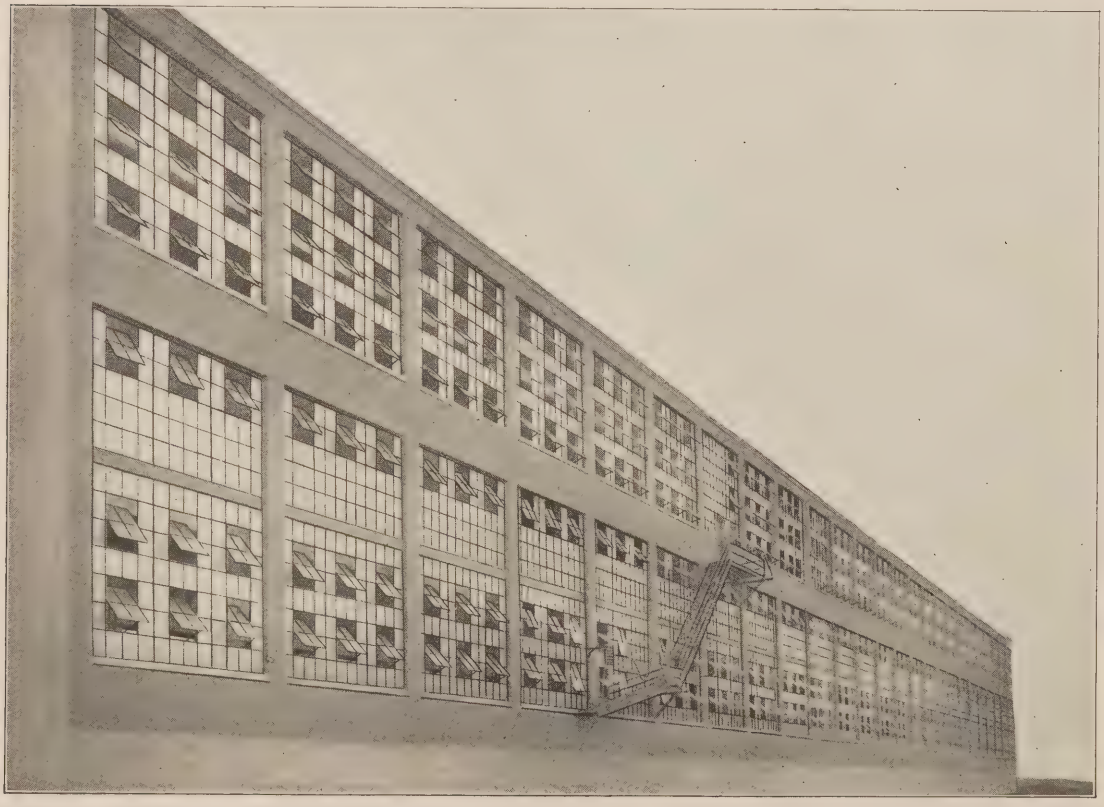
Lupton Steel Sash



Mr. O. A. Eckerman
Architect

Deere & Co., Harvester Plant
East Moline, Ill.

Short panels of Lupton Steel Sash, set high in walls, give necessary space for storage. Larger sash areas are provided in manufacturing buildings in background.

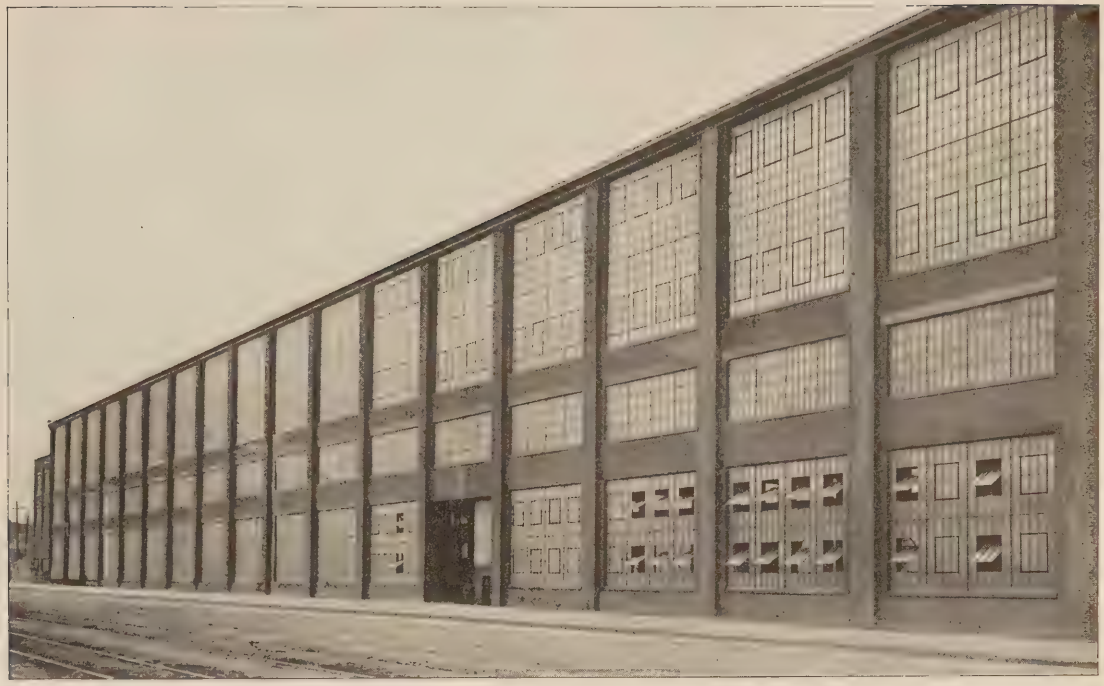


Messrs. Prack & Perrine
Architects and Engineers

Westinghouse Electric and Manufacturing Company, Machine Shop
East Pittsburgh, Pa.

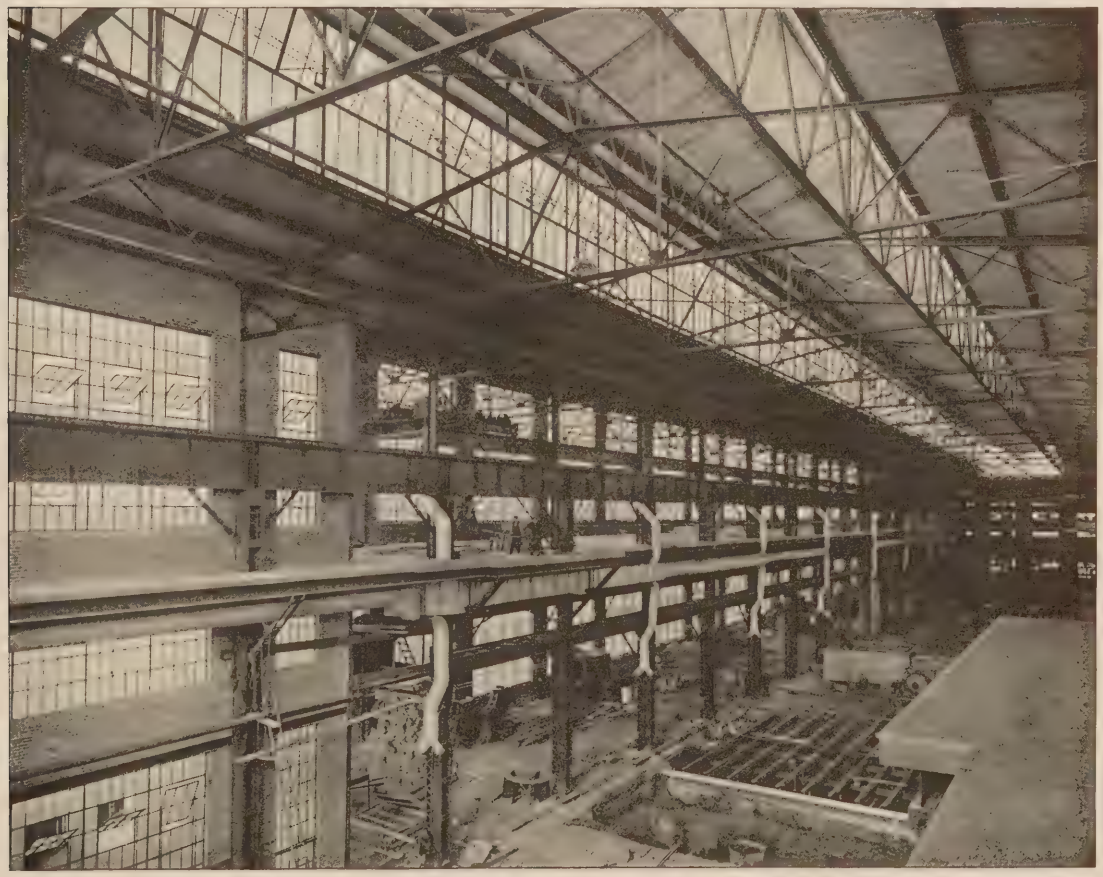
The two lower ventilators in each sash are connected by double arms and operated by peg and stay. The high ventilators are controlled by operating device.

Lupton Steel Sash

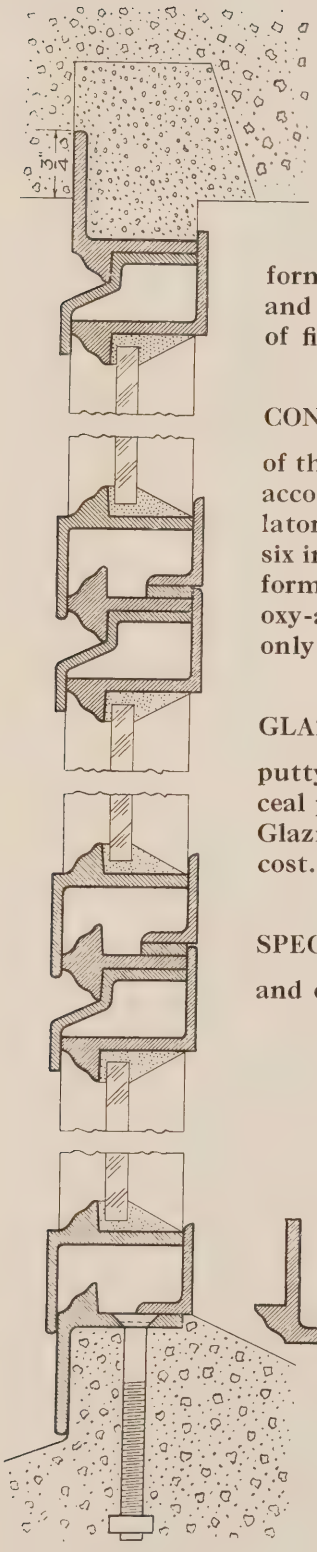


Hoffman Engineering and Construction Company — Cramp Shipbuilding and Engine Company
Philadelphia, Pa.

Exterior and Interior Views of Machine Shop
The main and gallery floors are well lighted and ventilated by Lupton Steel Sash in side walls and Pond Continuous Sash in monitor.



Lupton Steel Sash, Packard Type



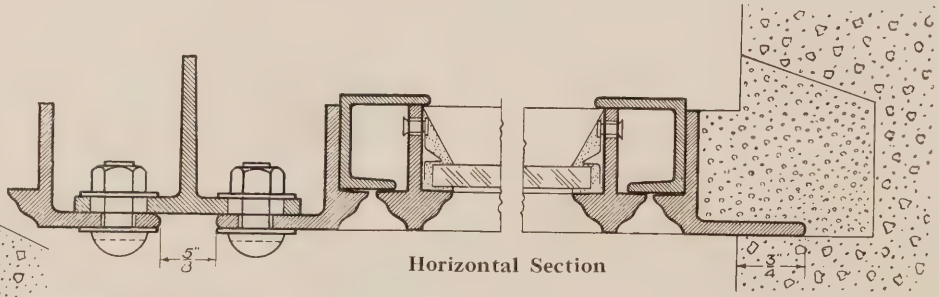
Vertical Section

A feature of Lupton Steel Sash, Packard Type, is that regardless of the number or location of the ventilators in a sash unit, the straight line effect of the mullions is preserved in their entire height by continuing the weathering members of the ventilators through all stationary portions of the sash. This uniformity of all lines, vertical and horizontal, gives a highly pleasing effect and makes the Packard Type Sash particularly adapted for use in buildings of fine architectural design.

CONSTRUCTION All members are solid one-piece rolled steel sections. Tee-bar mullions are always used between sash units of this type. Sash are usually three lights wide and two or three lights high, according to height of opening. No horizontal muntins are used. Ventilators extend full width of sash, which should not be wider than four feet six inches, and are constructed with a two-point contact at all sides, which forms a permanently tight double weathering. Ventilators are welded by oxy-acetylene process. Entire sash may be provided with ventilators or only one or two horizontal rows of lights may be ventilated, as desired.

GLAZING Sash may be glazed in the usual manner with glass held by Lupton Glazing Wedges and backed by bed of putty on inner face of sash member; but glazing angle frames, which conceal putty and give an inside finish, present a more attractive appearance. Glazing frames are furnished only when specified and at an additional cost.

SPECIFICATION Specify Lupton Steel Sash, Packard Type, made of solid rolled steel members with straight line mullions and oxy-acetylene welded double weathered ventilators.

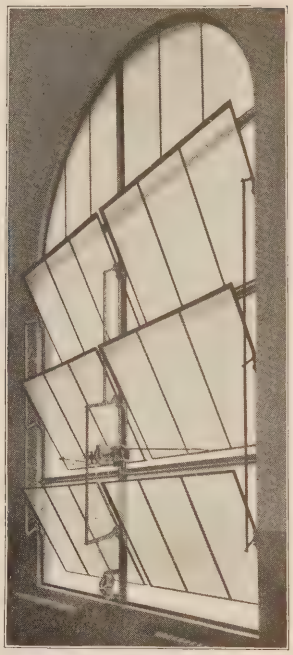


Tee Mullion

Horizontal Section

DETAILS ARE ONE-HALF FULL SIZE

Lupton Steel Sash, Packard Type



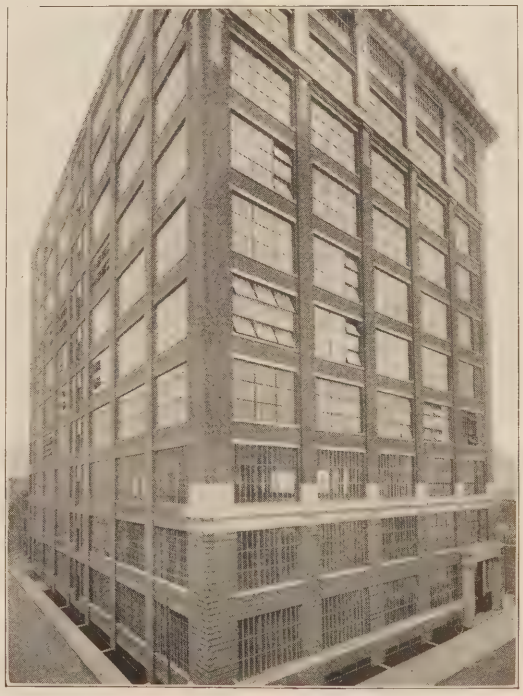
Lupton Steel Sash, Packard Type, with circular head. Ventilators controlled by Pond Operating Device.

Mr. Albert Kahn
Architect

Packard Motor Car Company
Service Building, Philadelphia, Pa.

Lupton Steel Sash, Packard Type, used throughout this building

In the Packard Company's building ventilators occur only in the middle row of lights, the upper and lower rows being stationary. The sash in the Goodman Building have ventilators in the top and bottom rows, while the middle lights are stationary. In the circular head sash the three rows have ventilators and only the lights in the curved head are stationary.



Goodman Building, Philadelphia

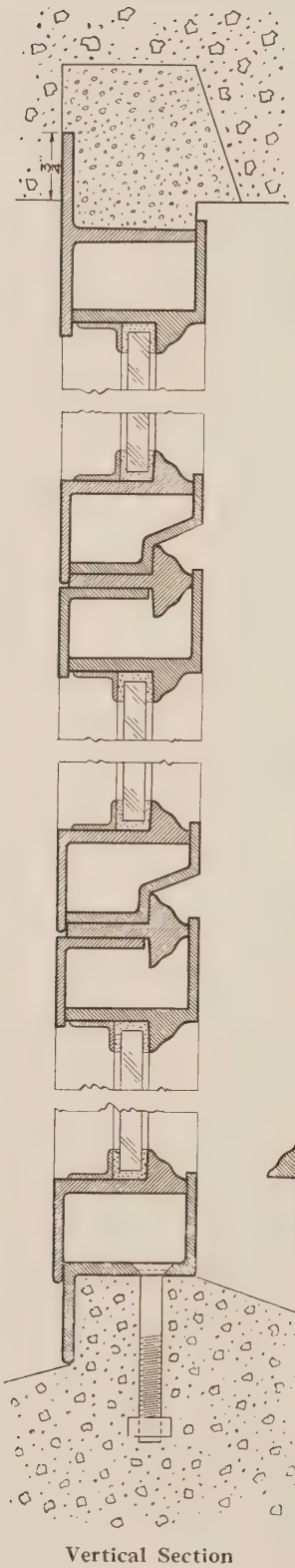
Wm. Steele & Sons Company
Engineers and Constructors

Lupton Steel Sash, Packard Type, in front elevation of building; standard type with Tee-bar mullions in other elevations.

Lupton Steel Sash

Projected Ventilator Type for Hospitals

DETAILS ARE ONE-HALF FULL SIZE



Vertical Section

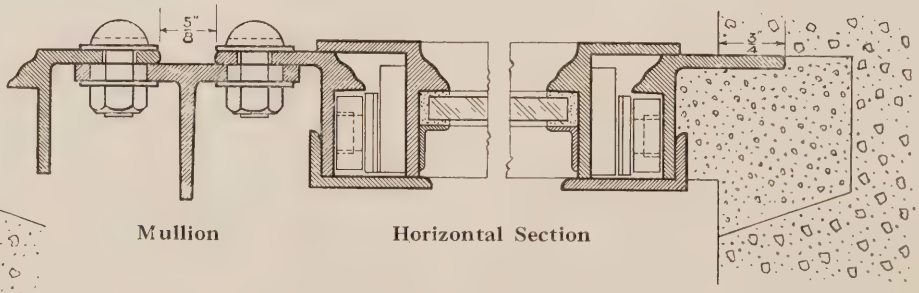
Ventilators operated by means of sliding arms moving in grooves at sides. These arms hold the ventilator at any angle of opening. No stays or operators of any kind are required. The ventilators open in from the top and no part projects past the outside of the sash.

Screens may be applied outside the ventilators and shades hung inside, each ventilator being provided with an individual shade. Free circulation of air may be had at all times without direct draft by reason of the ventilator opening in from the top.

Sash are constructed with the moulded face on the inside, instead of the outside as in other Lupton Steel Sash. Ventilators are constructed with a double weathering and are accurately fitted; joints are oxy-acetylene welded. Glass is held in place by glazing angle frames which conceal putty. Suitable hardware is provided. Sash units should not exceed four feet in width; ventilators always extend full width of sash and should not be higher than four feet.

General hospital practice as regards corners, mouldings and angles is observed as far as possible in the construction of the sash. Lupton Steel Sash, Projected Ventilator Type, have been substituted for certain windows in the Ophthalmic Ward of the Jefferson Hospital, Philadelphia, with highly satisfactory results.

Lupton Steel Sash, Projected Ventilator Type, with shades applied.



Mullion

Horizontal Section

Lupton Steel Sash, Power House Type

(Patented, and patents pending)

Lupton Steel Sash, Power House Type, are made to harmonize in appearance and construction with the massive effect of a well designed power house. The relation of vertical to horizontal lines is in correct proportion. The weight and strength of all members and the welded assembly of the sash assure permanent efficiency and practically eliminate maintenance.

Sash are made for openings of any size, with square, semi-circular or segment heads.

FRAME

Frame, impost and mullions are made of heavy steel plate, formed to receive and to provide double weathered contact with sash units. All vertical members present broad surfaces with proportionately lighter lines in horizontal members.

SASH

All sash in an opening are pivoted except those with curved heads. The operated sash are constructed with a double weathering at all sides and are hung on heavy pivots. Sash members are heavy one-piece rolled steel sections and are assembled by oxy-acetylene welded joints.

GLAZING ANGLE FRAMES

Glazing frames, made of light angles which conceal putty and give a pleasing finish to the inner face of the sash, are furnished when specified. This method of glazing is in keeping with the construction and finish of the Lupton Power House Sash, and the additional cost of the frames is well warranted.

SPECIFICATION

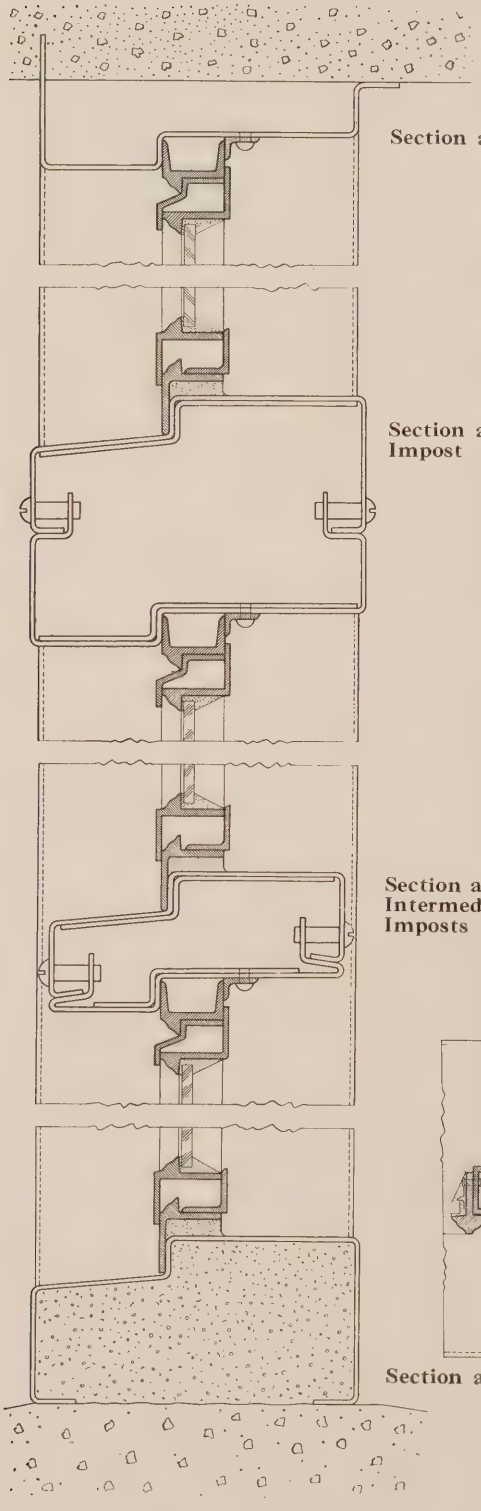
Specify Lupton Steel Sash, Power House Type, with plate steel frame, impost and mullions; sash made of rolled steel members with welded joints and double weathered ventilators. Sash to be controlled by Pond Operating Device, motor driven or operated by hand, as desired.

Lupton Steel Sash

Power House Type

(Patents pending)

DETAILS ARE
ONE-FOURTH FULL SIZE



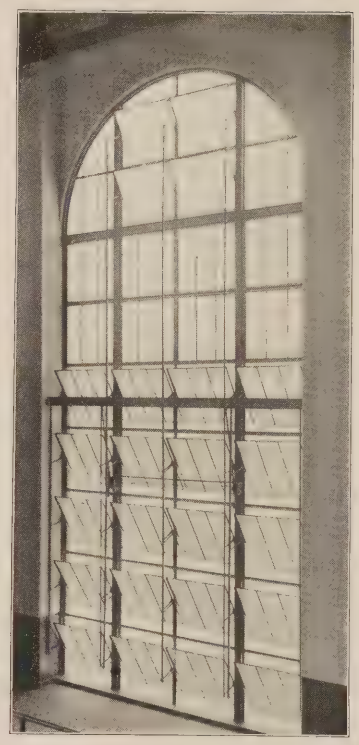
Section at Head

Section at Main Impost

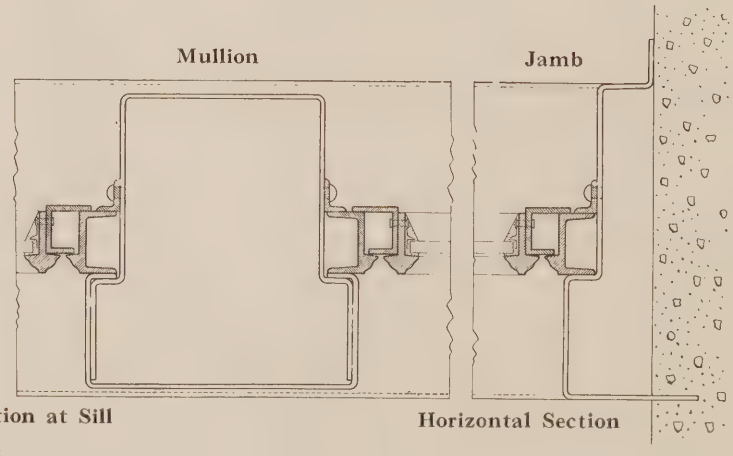
Section at Intermediate Imposts

Section at Sill

Vertical Section



Lupton Steel Sash, Power House Type, with Pond Operating Device.



Horizontal Section

Lupton Steel Sash, Power House Type

Stone & Webster Engineering Corporation
Constructing Engineers

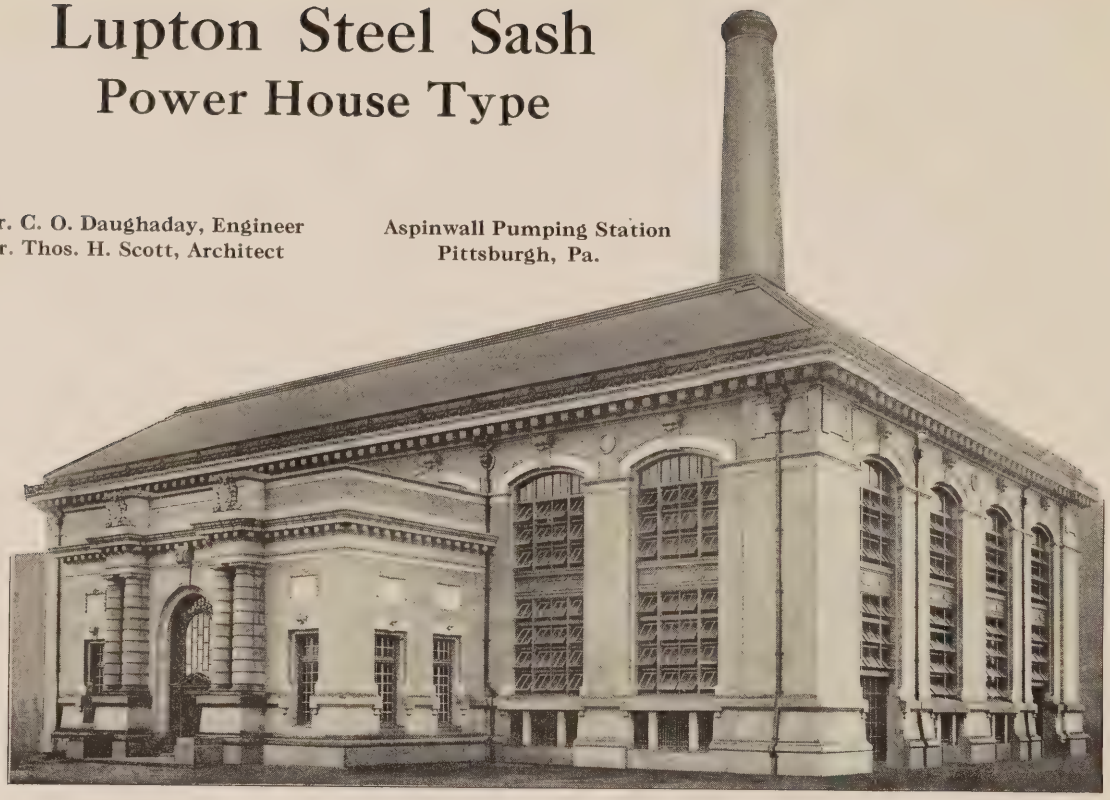
Mississippi River Power Company
Keokuk, Iowa

The large openings are filled with Lupton Steel Sash, Power House Type. Pond Operating Device, motor driven, controls all pivoted sash in the eighteen openings on side of building from one station. Lupton Steel Sash, Packard Type, are used in the smaller openings; these sash are also controlled by Pond Operating Device. See page 73 for Motor Driven Pond Operating Device.

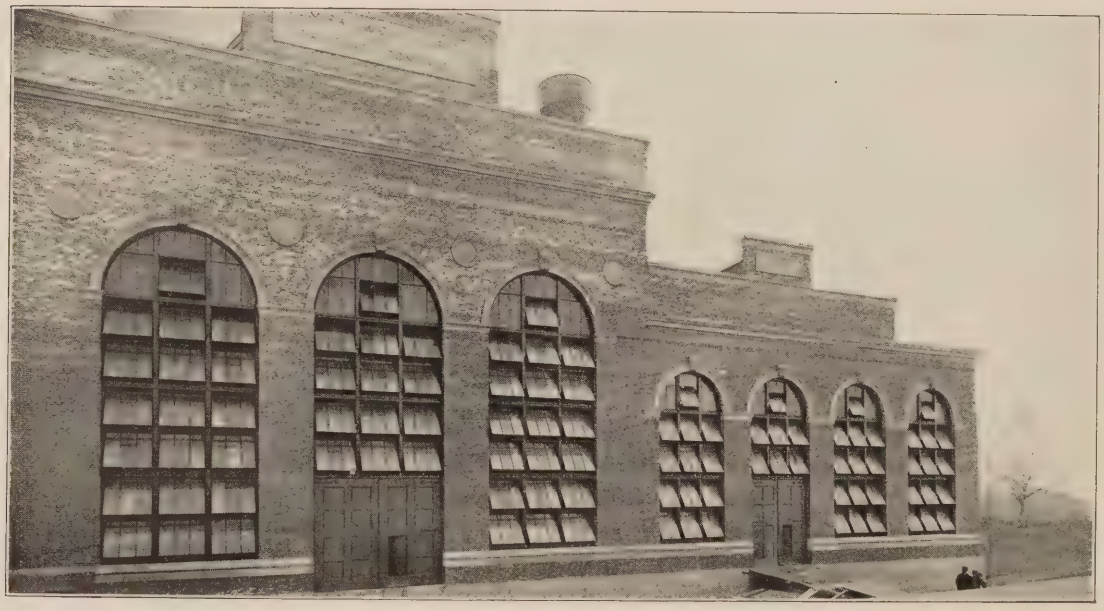
Lupton Steel Sash
Power House Type

Mr. C. O. Daughaday, Engineer
Mr. Thos. H. Scott, Architect

Aspinwall Pumping Station
Pittsburgh, Pa.



Lupton Steel Sash, Power House Type, controlled by Pond Operating Device. Openings are 13½ feet wide by 33 feet high. Concealed monitors with lines of Pond Continuous Sash are placed in roof. These monitors, while providing necessary roof lighting and ventilation, are not visible from the exterior of the building and do not interfere with the architectural design.



Mr. F. H. Shaw
Consulting Engineer

United Gas and Electric Corporation, Power House
Elmira, N. Y.

Lupton Steel Sash, Power House Type, equipped with Pond Operating Device.

Lupton Steel Sash, Counterbalanced Type

(Patents pending)

Lupton Steel Sash, Counterbalanced Type, give a greater ventilating area than the average pivoted sash; members are heavier and the construction stronger; sash when open do not project into the building. The sliding sash, with large lights and no horizontal muntins, simplify window cleaning. For openings higher than 12 feet, windows are made three sash in height; the upper and lower sash counterbalance over the middle sash, which is stationary. This arrangement provides a ventilating area of about 66⅔ per cent., and openings may be 18 feet high. Two sash are used in windows less than 12 feet high. The balanced distribution of the ventilating areas at top and bottom of windows gives the most effective circulation of air.

FRAME — Head is a 6-inch by 3½-inch angle for windows three sash high and 4-inch by 3-inch angle for two-sash windows. When sash occur in steel buildings these angles should be furnished by steel contractor. Jambs and mullions are special shapes rolled to provide runways and weathering for sash. One jamb in each opening is set in a plate steel pocket and provided with adjustment screws to permit removal of sash from frame.

SASH — Sash rails are heavy channel members, Section 110, thoroughly welded at corners by oxy-acetylene process. Meeting rails are provided with tight lapped weather stops. Upper end lower sash are hung on heavy steel chains with 5-inch turnbuckles attached to lower sash. Pulleys are 3-inch roller bearing. Bar lifts are included with sash, but locks are furnished only when specified.

GLAZING — We recommend the use of glazing angle frames; the finished appearance given by these frames amply covers their additional cost. Unless glazing frames are specified double-headed rivets are set in sash members to receive Lupton Glazing Wedges, and sash are glazed as shown on page 14.

WIND SHIELDS — When it is desirable to check direct currents of air from lower sash when open, we provide castings to be fitted to jambs and mullions which receive a light of glass 12 inches high, extending full width of sash. These shields admit a regulated amount of fresh air but deflect drafts. Glass can be removed by sliding the light from the castings. Wind shields are furnished only when specified and at an additional cost.

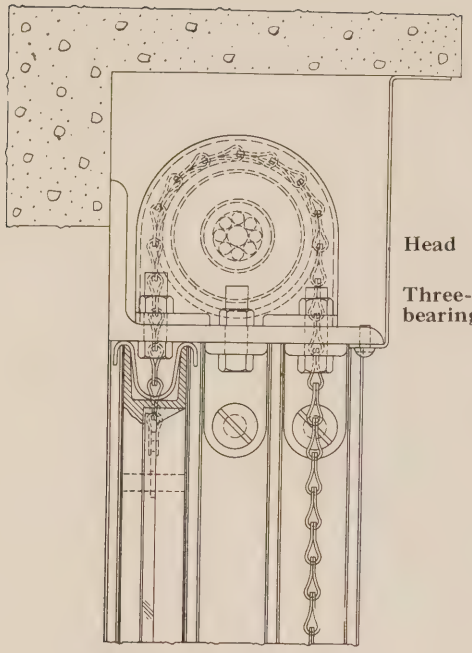
SPECIFICATION — Specify Lupton Steel Sash, Counterbalanced Type, with all joints oxy-acetylene welded, all members solid one-piece sections, with angle head and special rolled shapes for jambs and mullions; one jamb adjustable. Rails of Section 110 welded at joints; sash hung on heavy steel chains running over 3-inch roller bearing pulleys.

Lupton Steel Sash, Counterbalanced Type, equipped with Wind Shields

Lupton Steel Sash

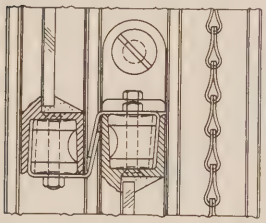
Counterbalanced Sash

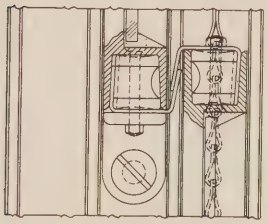
(Patents pending)

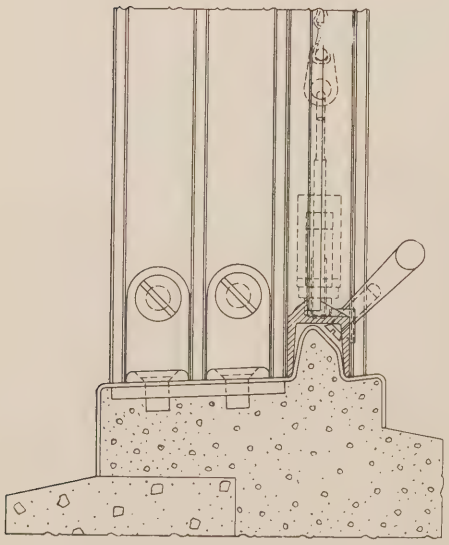


DETAILS ARE ONE-FOURTH FULL SIZE

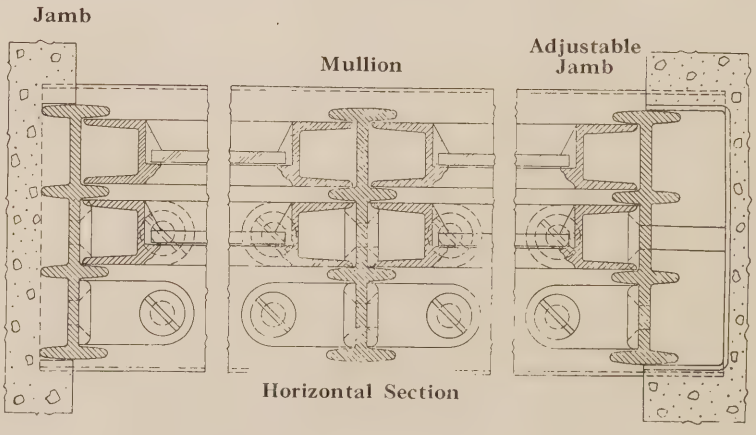
Members are solid one-piece rolled steel sections. No built-up sections are used in any Lupton Sash. All joints are oxy-acetylene welded. Strength, freedom from opportunity for corrosion, and durability are features of Lupton Steel Sash, Counterbalanced Type.







Vertical Section



Horizontal Section

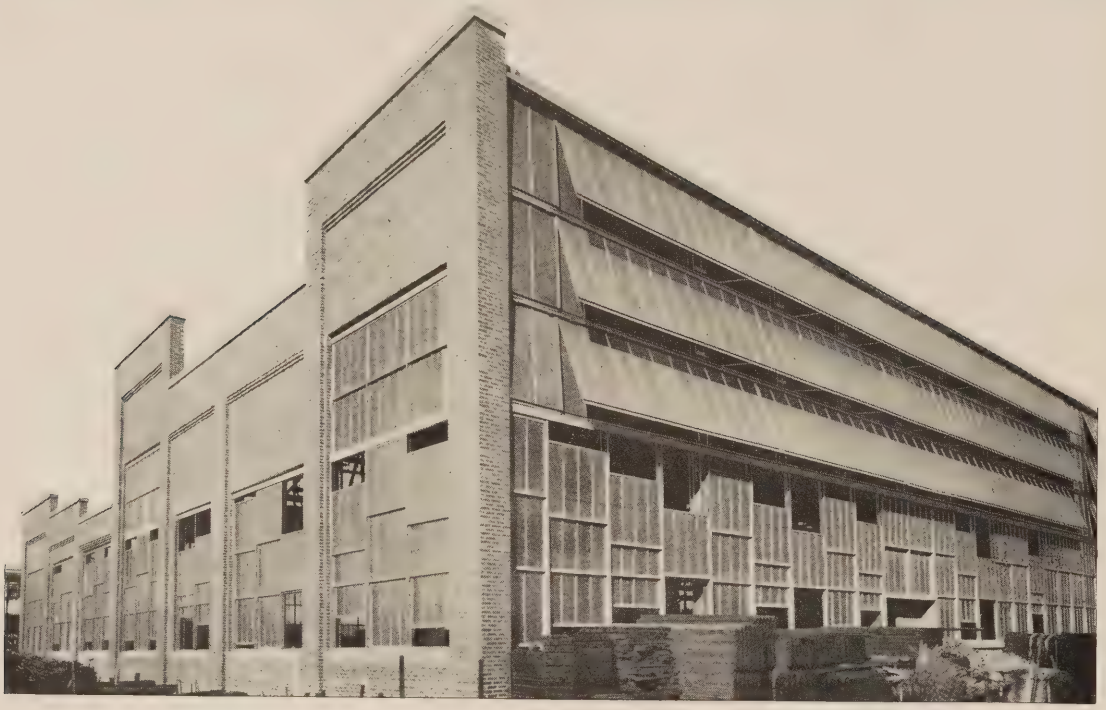
Lupton Steel Sash, Counterbalanced Type

Wm. Steele & Sons Company
Engineers and Constructors

Electro Dental Manufacturing Company
Philadelphia, Pa.

Lupton Steel Sash, Counterbalanced Type, are used throughout this building. The openings are filled by three units, each being two sash high. All are equipped with wind shields, as shown in interior view.

Lupton Steel Sash, Counterbalanced Type



Mr. O. A. Eckerman
Architect

Deere & Co., Harvester Works
East Moline, Ill.

Lupton Steel Sash, Counterbalanced Type, in lower side walls. These windows are three sash in height and are set continuously in sides of building and in panels between pilasters at ends of building. Pond Continuous Sash controlled by Pond Operating Device is used in upper side walls.

Messrs. Harris & Richards
Consulting Engineers and Architects

General Vehicle Company
Long Island City, N. Y.

Lupton Steel Sash, Counterbalanced Type, are used throughout this building. Windows in first story are three sash a ıd in other stories two sash in height.

Lupton Steel Sash, Counterweighted Type

(Patents pending)

Lupton Steel Sash, Counterweighted Type, completely fulfill the exacting requirements for steel windows suitable for fine office and public buildings. The sash are absolutely weather- and draft-proof, but are free from binding; they lift easily, but will not rattle. Careful attention to design and finish gives the window the required attractiveness of appearance.

FRAMES AND SASH Head and sill are made with weather stops over which the rails of top and bottom sash rest. Jambs are special rolled steel sections, made to receive the rolled bronze weather strips and give a contact with one leg of each sash member. Sash are made of standard Lupton solid steel sash members oxy-acetylene welded and carefully finished at the joints. Meeting rails are provided with tight weathering. Sills have bronze weather strips.

ROLLED BRONZE DOUBLE WEATHERING Attached to each steel jamb is a rolled bronze weathering member provided with two lipped grooves in which one leg of each sash member moves. The lips of each groove give a double contact to the sash member. The steel member moving in close contact with the bronze member makes an absolutely tight weathering, without binding or friction. The movement of the sash is free at all times, but the double contact prevents rattling.

GLAZING AND GLASS SIZES Sash are equipped with glazing frames made of light angles cut to fit each light and tap-screwed to sash members. These frames conceal the putty in which the glass is bedded and give a finished face to the inner side of the sash. Sash are made to take a single light or are divided into several lights, as may be required by design of building. Suitable bar lifts and locks are furnished with the windows.

SPECIFICATION Specify Lupton Steel Sash, Counterweighted Type, with formed steel frame, rolled steel jamb facings, rolled steel sash members welded at joints, rolled bronze double weathering members; sash provided with glazing frames.

Messrs. Harris & Richards
Consulting Engineers and Architects

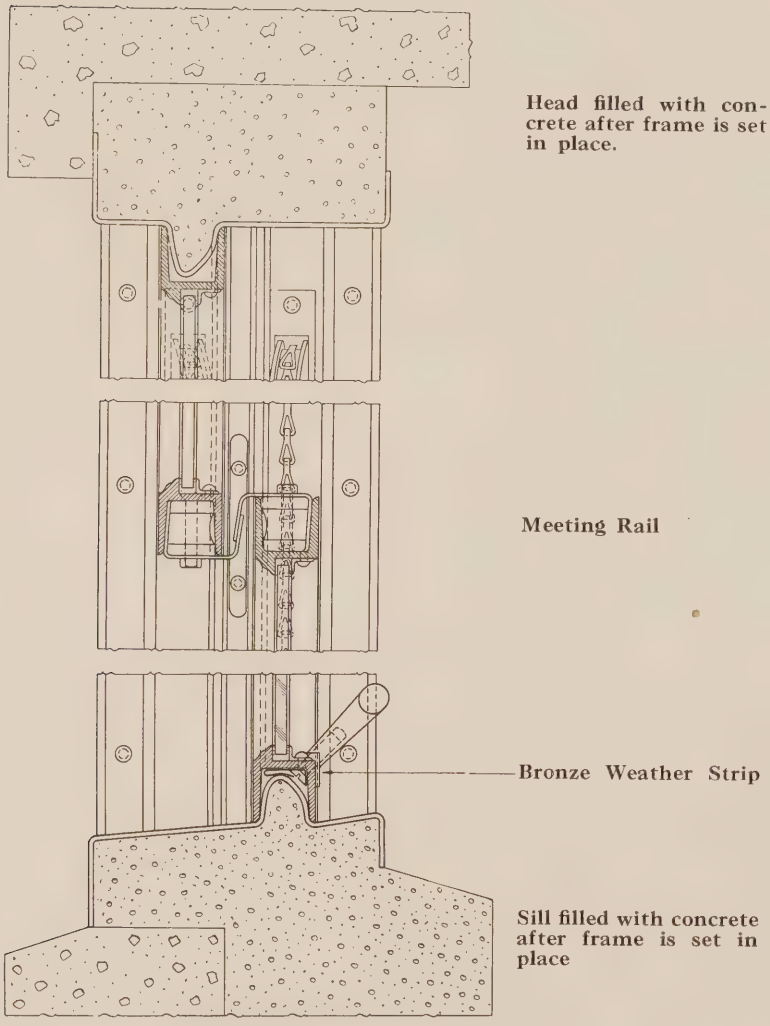
General Electric Company, Lamp Works
East Boston, Mass.
Mr. H. L. Bolton, Engineer

Lupton Steel Sash, Counterweighted Type, with pivoted transoms. Because of the inflammable nature of the product manufactured here, only the lower sash is counterweighted, the upper sash is made stationary, so that there will be no interference in opening lower sash to full height. The pivoted transoms supply ventilation at ceilings.

Lupton Steel Sash, Counterweighted Type

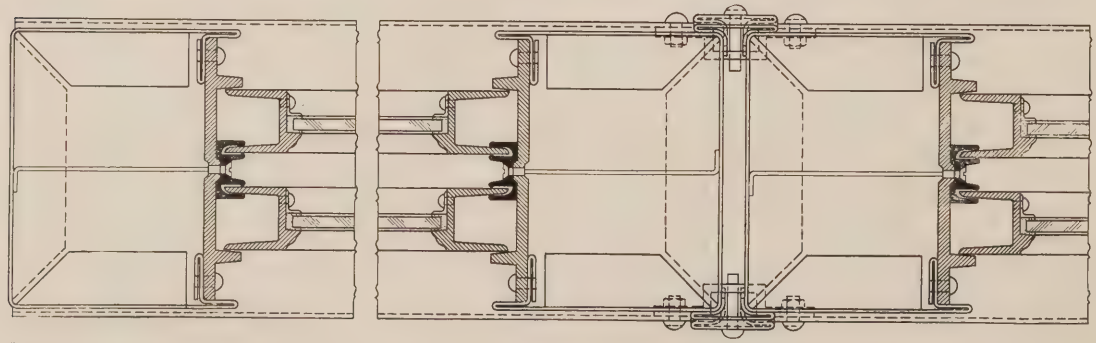
(Patents pending)

DETAILS ARE ONE-FOURTH FULL SIZE



Vertical Section

Note the rolled bronze double weathering at each jamb, which assures positive weather tightness of sash without binding.



Jamb

Mullion

Horizontal Section

Lupton Steel Sash, Counterweighted Type

Victor Talking Machine Company
Building No. 18 A
Camden, N. J.

Messrs. Ballinger & Perrot
Architects and Engineers

Lupton Steel Sash, Counterweighted Type, are used on street front of this building, where offices are located.

Lupton Steel Partition

(Patents pending)

Standard partition heights are 8 feet, 10 feet and 12 feet; in width, units are 5 feet 9 5/16 inches to centers of mullions. When partitions are higher than 12 feet additional panels of height required are set on the rectangular impost over the 12-foot unit, or if the additional height is small, steel filler plates are used. Units of special width are furnished to fill out length of line as required. The lower part of each partition unit to a height of 4 feet from floor is filled with a steel plate; the upper part is glazed with glass of any kind or filled with wire screen. The heavy mullions and imposts, combined with the solid rolled steel members of the panels, give strength and rigidity of construction to withstand hard usage in a factory building, while the attractive appearance of the partitions makes them suitable for fine office divisions. All parts are interchangeable and an entire partition or any part of it can be taken down and erected elsewhere without removing glass or making any reconstruction.

FRAMING — Mullions are spaced 5 feet 9 5/16 inches on centers and set over and conceal standards which are secured to floor. Imposts are neatly fitted to mullions and are finished to receive filler plate or additional partition unit as may be required. Mullions and imposts are so constructed that the partition panels and panels containing doors can be removed and reset with least labor and without disarrangement of remainder of partition. By referring to details on next page it will be seen that it is necessary to remove only a few bolts in order to take out any unit.

UNITS — All members are heavy one-piece rolled steel sections strongly assembled and carefully finished. Frame member is channel Section 104, which gives ample bearing in mullions. Lower part of panel is filled with a plate of 14-gauge steel. Lights are large and horizontal muntins are eliminated. Glass is held in place, after being bedded in putty, by frames made of light angles which are tap-screwed to partition members. These frames conceal the putty and give a detailed finish to the side of the partition opposite the moulded face of the members. Both sides of Lupton Steel Partition are carefully finished and present an equally attractive appearance.

DOORS — Lupton Steel Doors for partitions are made with stiles of seamless rectangular tubing which are welded at the joints to give strength and entire freedom from sagging. See details on page 43. We include heavy steel hinges, but do not furnish other hardware except when specified.

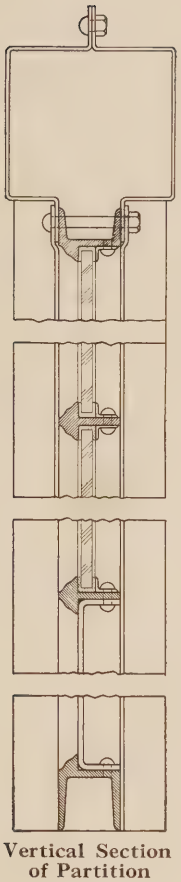
COMPARISON — Compare the appearance and construction of Lupton Steel Partition with so-called partitions composed of side wall sash bolted to mullions without practicable provision for changing position of partitions after erection, and with glass set in unconcealed putty.

SPECIFICATION — Specify Lupton Steel Partition with units made of rolled steel sections, lower part filled with steel plate, upper part glazed as desired and provided with glazing frames; units to be placed in heavy steel mullions and imposts. Doors to have stiles of seamless rectangular tubing, welded at joints. All to be constructed to present equally attractive appearance on both sides and to permit taking down and re-erecting without reglazing or reconstruction.

Lupton Steel Partition

(Patents pending)

DETAILS ARE ONE-FOURTH FULL SIZE



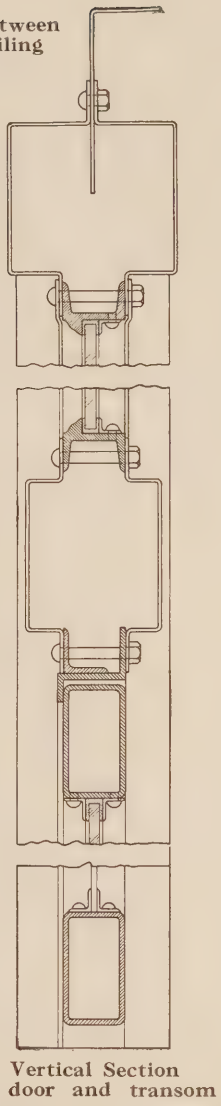
Impost for partition which does not extend to ceiling

Vertical Section of Partition

Partition units are 5 feet 9 5/16 inches from center to center of mullions. Units containing doors are interchangeable with plain units. Standard heights are 8 feet, 10 feet and 12 feet.

Glazing angle frames, which conceal putty, give a pleasing finish on the side of the partition opposite the moulded face of the members.

Note accessibility of bolts which secure units to mullions and imposts.

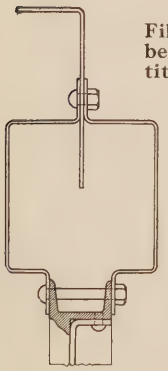


Filler Plate between impost and ceiling

Impost

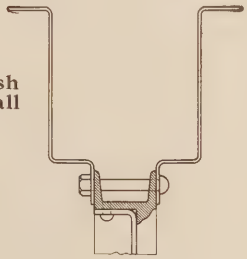
Door

Vertical Section at door and transom

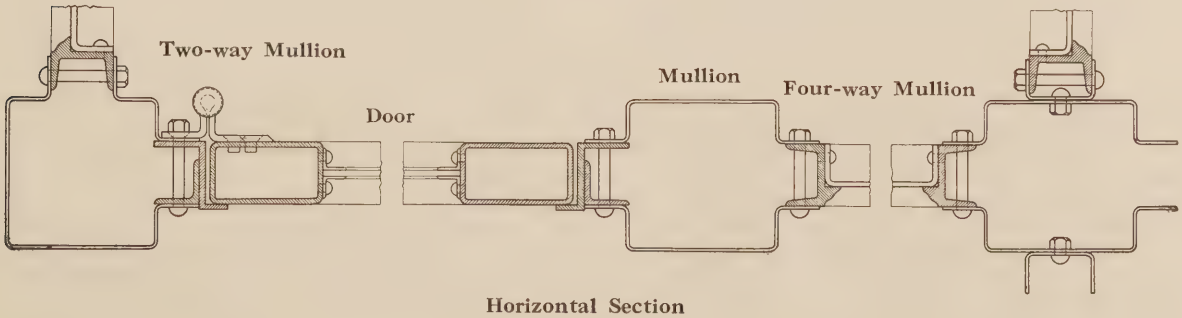


Filler Plate to finish between wall and partition

End Framing



End Framing to finish against wall



Two-way Mullion

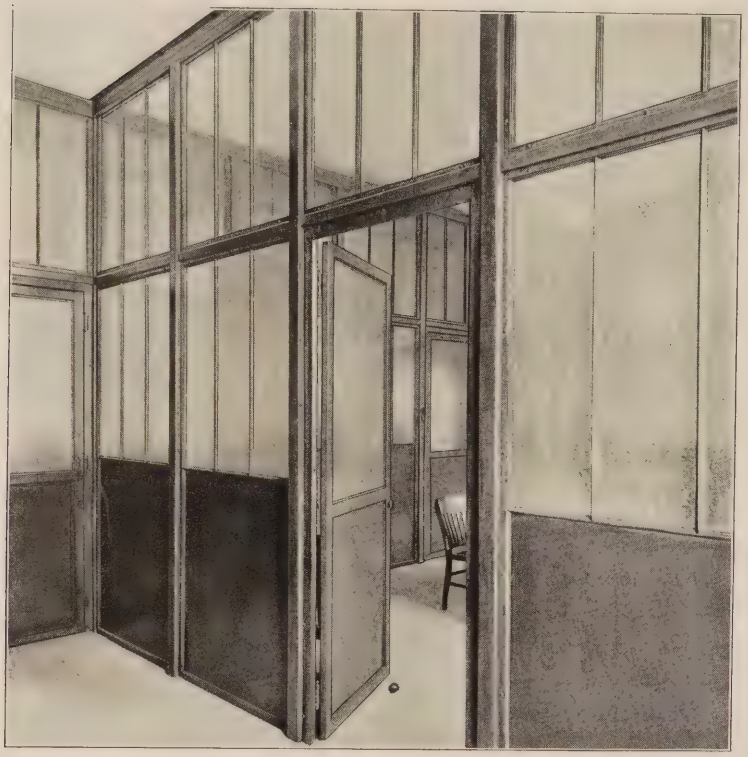
Door

Mullion

Four-way Mullion

Horizontal Section

Lupton Steel Partition



Mr. J. Horace Frank
Architect

Philadelphia Rapid Transit Company
Philadelphia, Pa.

Lupton Steel Partition and Door. Lower part of partition to a height of four feet is filled with steel plate, from plate to impost with obscured glass and above impost with clear glass. The large lights and absence of horizontal muntins add to the appearance of partition. Doors have stiles of rectangular tubing welded in one piece, and are hung on heavy steel hinges with bronze washers.

Mr. M. M. Thrane
Engineer

General Electric Company
Pittsfield, Mass.

Lupton Steel Partition. Units eight feet high, with partition in background extending to ceiling.

Lupton Steel Partition

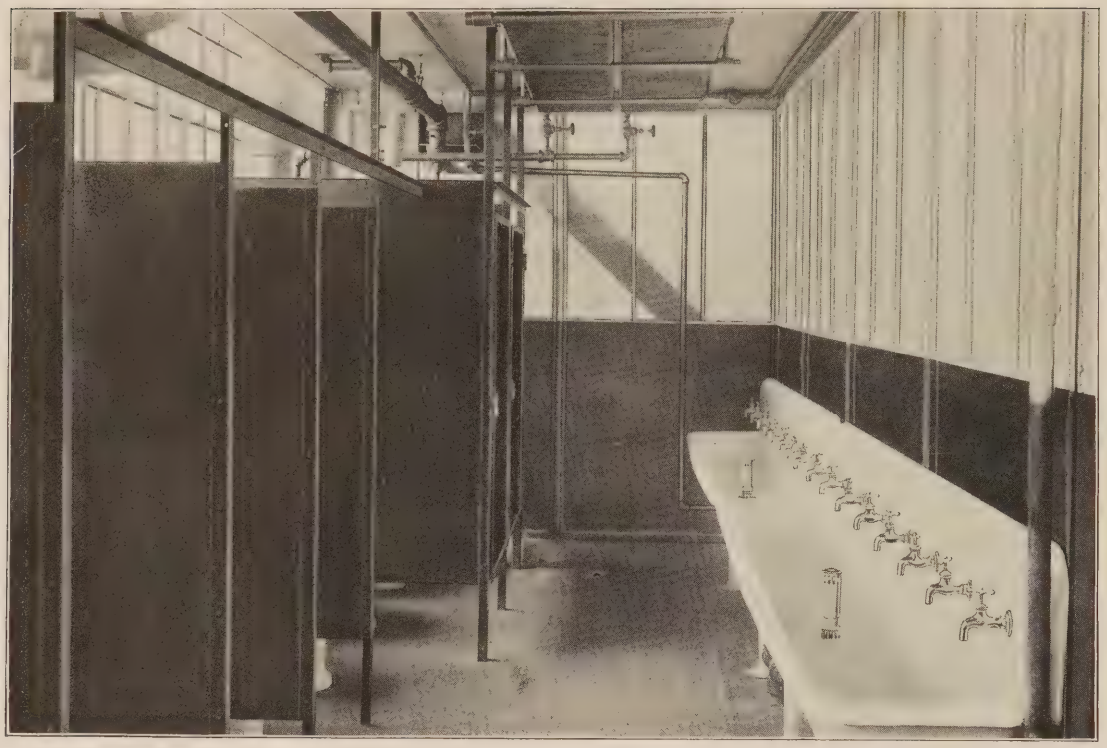
Messrs. Harris & Richards
Consulting Engineers and Architects

General Vehicle Company
Long Island City, N. Y.

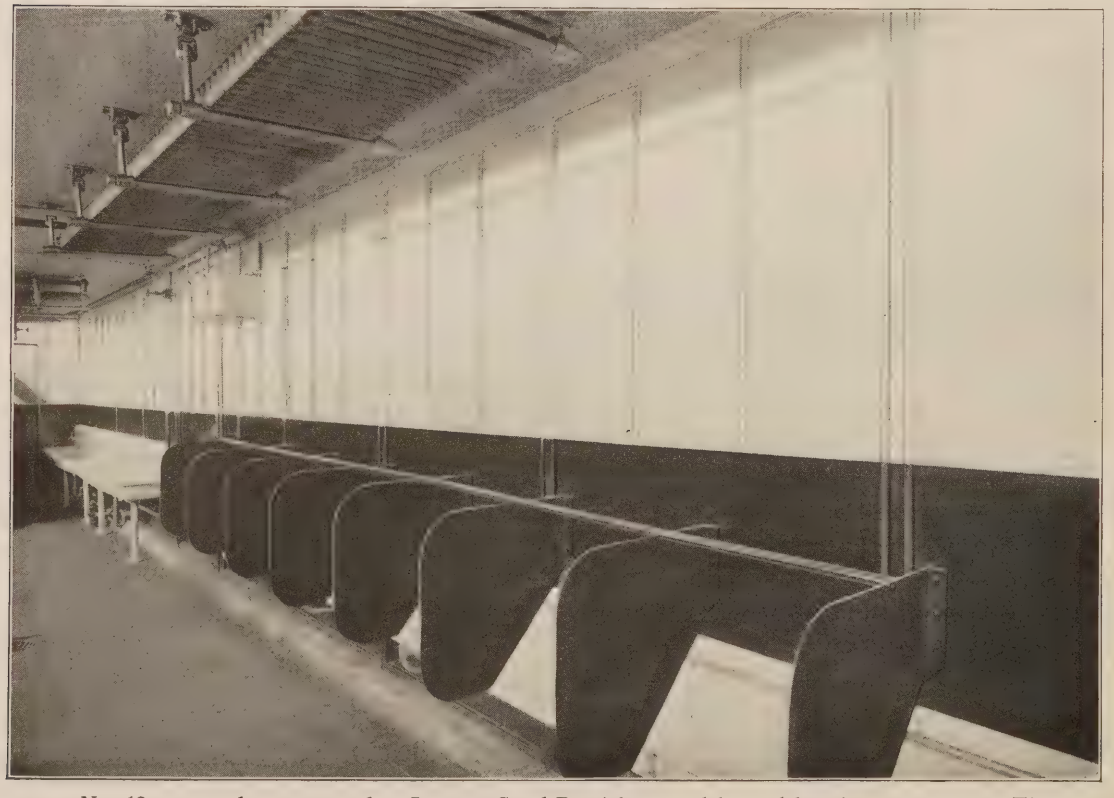
Lupton Steel Partitions are used in offices throughout this building. Note wire ribbon and shelf in partition around Cashier's Office.

Lupton Steel Partition

Combined with special steel plate accessories make attractive and sanitary toilet rooms

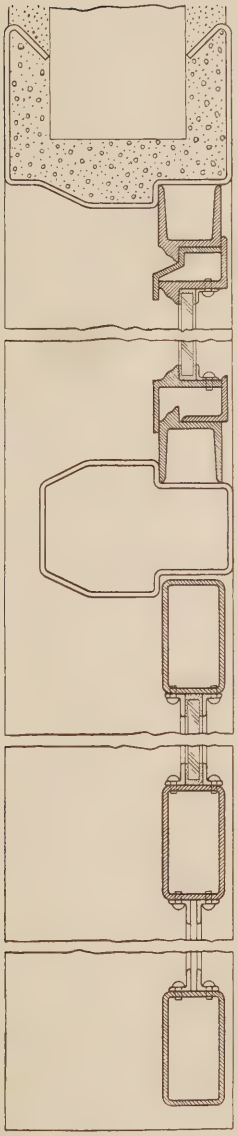


Toilet room is enclosed by Lupton Steel Partition, 8 feet high. Ceiling is made of No. 16 gauge steel plates supported on channel frame and finished flush on under side. Closet divisions are No. 12 gauge steel plates on angle frame. Doors are provided for foreman's closet.



No. 12 gauge plates secured to Lupton Steel Partitions and braced by pipe across top. The porcelain trough is also hung on the partition. We design divisions and stalls to meet conditions required by fixtures, but do not furnish any plumbing work.

Lupton Steel Tube Doors and Jambs



Vertical Section of Door and Transom

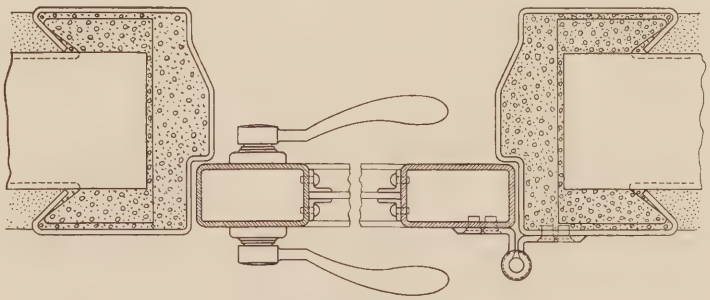
These doors and jambs are made with particular reference to interior and exterior openings in combination with Lupton Steel Sash, Counterweighted Type. Jambs are made for any size of partition or exterior wall.

JAMBS — Jamb casing and trim are made in one piece from heavy steel plate welded at corners, and made to fit any thickness of wall.

DOORS — Doors are made with stiles of seamless rectangular tube 2½ inches by 1⅜ inches, accurately fitted and welded at points of assembly. Lower panel is filled with a steel plate, and upper part with glass in a single light, or with plate. Three heavy steel hinges are furnished with each door; no other hardware is included unless specified. Lupton Steel Tube Doors with one-piece welded assembly of stiles cannot be forced out of alignment. Compare Lupton Door construction with doors made of light steel sash members, assembled by riveted joints.

SPECIFICATION — Specify Lupton Steel Tube Doors made with stiles of specially rolled seamless rectangular tube assembled by oxy-acetylene welding in one piece; plate and glass held by angles tap screwed to tube and giving a uniform finish on both sides. Jambs and trim formed from heavy plate steel and welded at corners.

DETAILS ARE ONE-FOURTH FULL SIZE



Horizontal Section

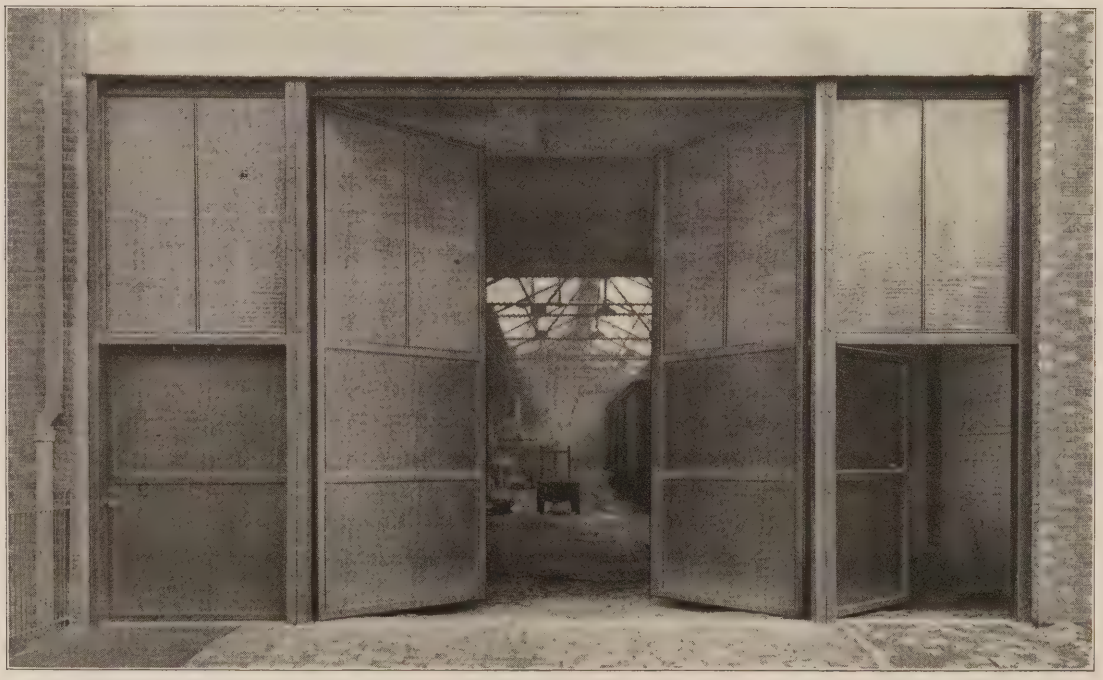
Transoms are made stationary unless otherwise specified. We furnish hinges; other hardware should be furnished by owner. Locks may be concealed in door stile.

Lupton Steel Tube Doors, Hinged Type

Lupton Steel Tube Doors are made in any size and for any purpose, hinged singly, in pairs or in several leaves, double acting, etc. For large doors the outside stiles are made of 3-inch by 2-inch tube and any inner stiles of 2½-inch by 1⅜-inch tube. Every point of assembly is thoroughly welded by the oxy-acetylene process and all open ends of tube are closed by caps welded in place. Where large glass areas occur in doors, panels of Lupton Steel Sash are set between the stiles; steel plates are used as fillers elsewhere. Small pass doors are included when required.

The natural strength of the rectangular tube sections and the welded assembly of Lupton Steel Tube Doors assure the same strength, rigidity and comparative ease of operation in locomotive-size doors as in small passage doors.

Let us know your requirements for steel doors and we will submit drawings and prices for any practicable conditions.



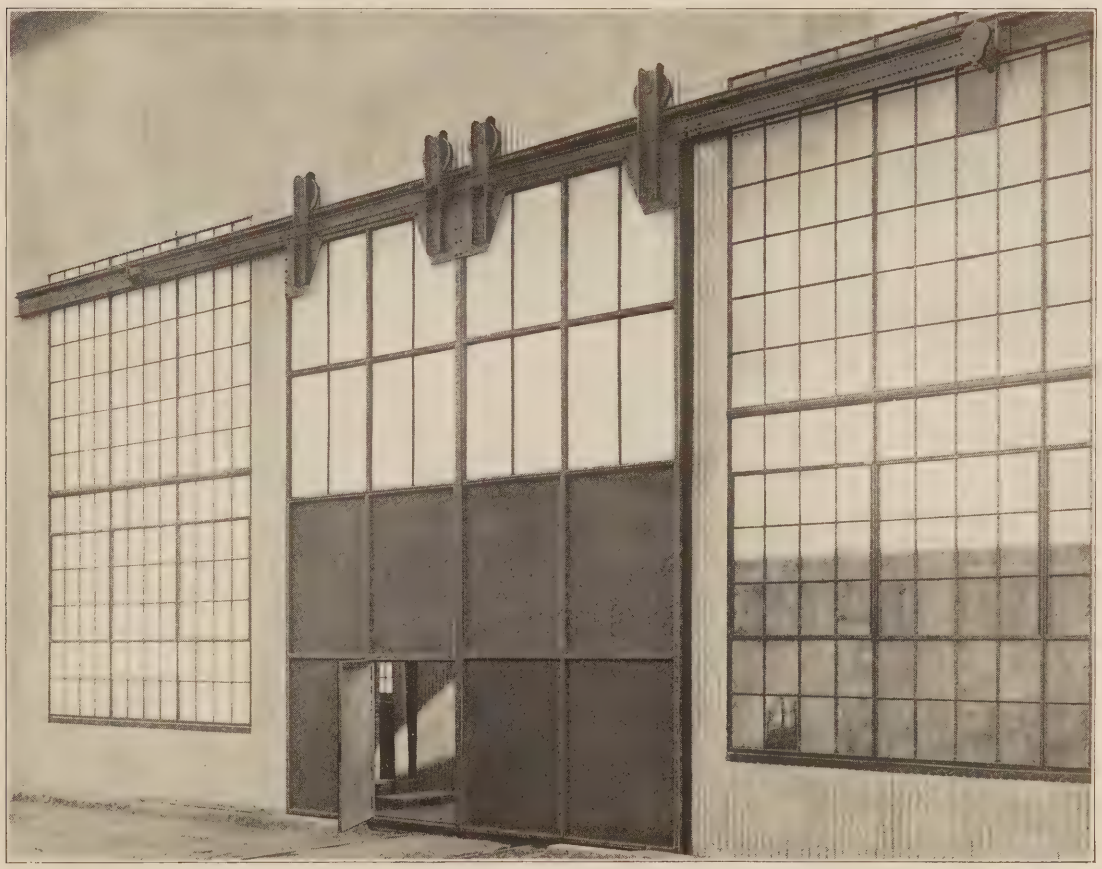
Lupton Steel Tube Doors, Hinged Type

At each side of the large pair of driveway doors is a small door for incoming and outgoing workmen. This arrangement of doors makes a particularly effective entrance for a manufacturing plant. The opening for the large pair of doors is 12½ feet by 13 feet. Doors are hung on malleable iron hinges with bronze washers.

Lupton Steel Tube Doors, Sliding Type

We give special attention to manufacturing sliding doors of extreme size to open singly or in pairs. The heavy rectangular tube and welded assembly make a construction which is particularly necessary for permanently efficient doors of this kind. Doors can be operated by hand or we will equip them with a mechanical operating device.

We invite consultation regarding best types of doors to meet unusual conditions. We will prepare comprehensive drawings showing our ideas.

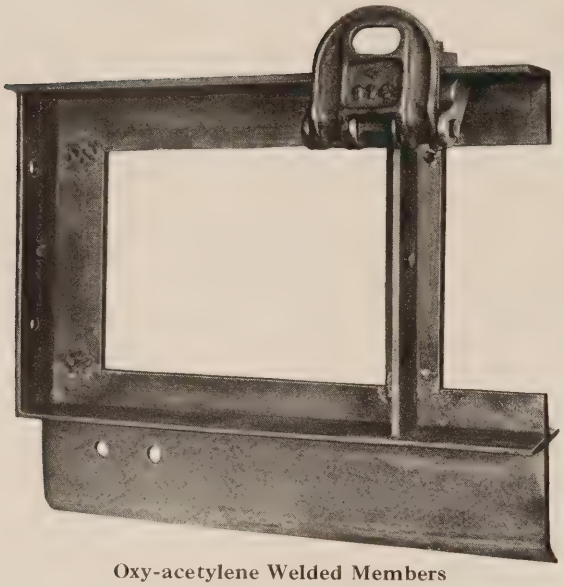


Cramp Shipbuilding and Engine Company
Philadelphia, Pa.

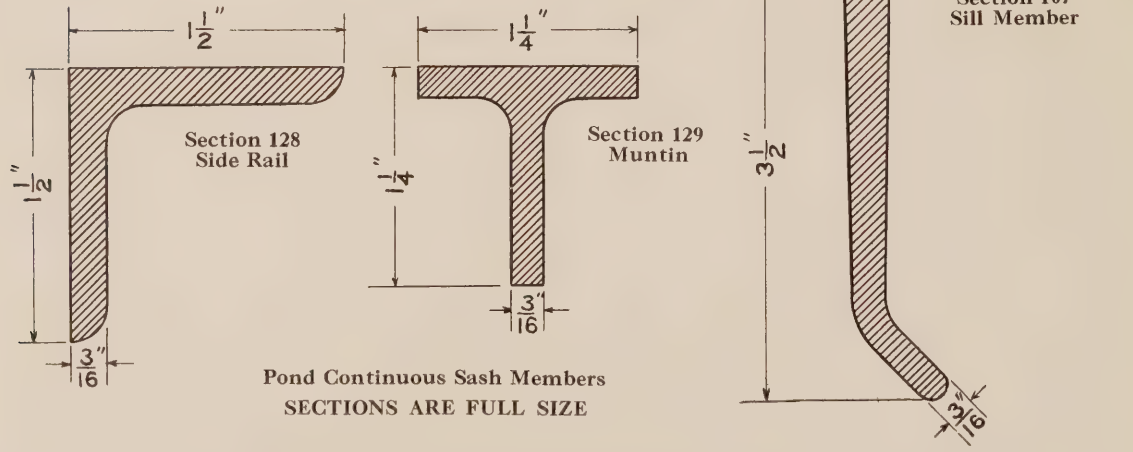
Exterior view of a pair of Lupton Steel Tube Doors, Sliding Type, for opening 16 feet by 21 feet. Doors are opened and closed by operating device, which is controlled by chain carried down to gateman's office to the right of doors. Hinged pass door is provided in lower panel.

Pond Continuous Sash

(Patented by Clarke P. Pond, and patents pending



Oxy-acetylene Welded Members



Pond Continuous Sash Members
SECTIONS ARE FULL SIZE

Full size details on this page show heavy members used in Pond Continuous Sash. The structure of the sill member, Section 107, gives the required strength at the point of severest strain; the bent stem of this member makes a tight contact at curb; arms of Operating Device are attached to the inner flange and the outer flange is provided with drip holes at each light. Other members are of section and weight to give best results.

All members are accurately framed and assembled by thoroughly welding by the oxy-acetylene process. The welding gives strength and rigidity which are impossible to obtain by any other method. Each panel is a one-piece sash. Hinges are heavy malleable iron with bronze pins, especially made for Pond Continuous Sash.

Continuous sash can be made of lighter or built-up members with riveted or interlocked joints at some saving in first cost, but Pond Continuous Sash is the cheapest sash you can buy, maintenance cost considered, because it is the best sash we can make. The simple heavy members and the method of assembling make Pond Continuous Sash the standard for strength, efficiency and durability.

Train load of Pond Continuous Sash, seventy thousand square feet, for the Union Tool Company, Los Angeles, California.

Pond Continuous Sash

Welding Pond Continuous Sash

Pond Continuous Sash is a weather-proof sash; it can be opened to give ventilation in inclement weather without exposing the interior of the building. The continuous feature of Pond Sash—a weather-sealed area of glass and steel the entire length of the sash line—is obtained by hanging connected panels of sash in an unbroken series outside of all structural work. An angle, or Z bar, under which the sash is hinged, forms a protective hood at the top. At each end of an operated line the hinged sash laps a storm panel 2 feet wide which prevents entrance of weather at the ends. Pond Continuous Sash is positively weather-tight, open or closed, under all conditions.

MEMBERS

All members are solid rolled steel sections of weight and shape to give strength necessary for this type of sash. Light solid sections suitable for side wall sash do not give sufficient strength and stiffness, and built-up sections are particularly out of place in continuous sash construction because of the strain in opening and closing operating lines.

Top rail of Pond Continuous Sash is 2″ x 1½″ x 3/16″ angle; side rails, 1½″ x 1½″ x 3/16″ angles; muntins are 1¼″ x 1¼″ x 3/16″ tees. Sill member, 3½″ x 2¾″ x 3/16″, is a winged section with a bent stem specially rolled for Pond Sash. The structure of this member gives required strength at point of severest strain; the bent stem makes a tight point contact with curb; the inner wing receives arms of operating device and the outer wing is provided with drip holes for drainage.

WELDING

The members of a sash panel are accurately framed and fitted, and are then welded at points of assembly. Each member is made an integral with its fellow members by the white heat of the oxy-acetylene torch. The result is a jointless, one-piece unit, with the natural strength of the individual members reinforced by the coalition of these members into a united whole. The cost of oxy-acetylene welded assembly is many times that of cold pressed or riveted joints, but it is only by this process that the strength, rigidity and freedom from corrosion necessary for permanently efficient continuous sash construction can be obtained. Lighter members and cold pressed or riveted joints reduce the manufacturing cost of continuous sash, but such sash are not economical because of their unsatisfactory operation and their high cost of maintenance.

STANDARD SIZES

Pond Continuous sash is made in panels 20 feet long and in standard heights as follows:

No. 3 Sash 3′ high	Size of lights 23⅜″ x 2′ 8¾″
No. 4 Sash 4′ high	Size of lights 23⅜″ x 3′ 8¾″
No. 5 Sash 5′ high	Size of lights 23⅜″ x 4′ 8¾″
No. 6 Sash 6′ high	Size of lights 23⅜″ x 5′ 8¾″

Vertical muntins are placed two feet on centers. No intermediate horizontal muntins are used. The ¼-inch glass is in single lights full height of sash. When openings exceed 6 feet, the maximum height of a single sash, two or more sash are placed one above the other. See tables on pages 50 and 52 for heights of openings to receive standard sash. While the sash are made in panels 20 feet long the sash line need not be a multiple of 20 feet. We make special end sections to fill out the lines. These sections include storm panels for operated lines of sash.

GLAZING Sash should be glazed with ¼-inch glass. Lights are bedded in special putty and held securely by Lupton Glazing Wedges, similar to those for glazing Lupton Steel Sash shown on page 14, but larger and made of copper. Glass is set from the outside. Sash are given a thorough coat of paint at the factory and should be painted two color coats after erection.

OPERATION The success of continuous sash ventilation depends directly upon the operating device. Only a device of exceptional power can satisfactorily control lines of any considerable length, as the entire weight of top hung sash must be lifted. Pond Continuous Sash is controlled exclusively by Pond Operating Device (see pages 66 to 75). The worm gear, which is immersed in oil, automatically locks the sash in any position whether open or closed and prevents slamming the sash and breakage of glass. The varying load of top-hung sash is offset by spirals and counterweights (see page 70), which are applied to sawtooth or sloped sash lines longer than 50 feet, and to vertical sash lines longer than 100 feet. Every installation of operated Pond Continuous Sash shown in this catalogue is a convincing illustration of the power and accurate alignment of control given by Pond Operating Device. We guarantee Pond Operating Device to control longer lines of continuous sash and to open the sash to a greater angle with less applied power than any other device.

STRUCTURAL STEEL WORK REQUIRED An angle or Z-bar is required at head of sash, and an angle or other member giving a flat surface is required below sash. When two lines of sash, one above the other, are used in sawtooth construction or on sloping surfaces, a member is not required at head of the lower sash if it is stationary (see detail, page 50). If both upper and lower sash are operated, an angle is required above each sash to which it may be hinged.

When two or more sash are used in monitor construction or in any vertical position, an angle is required at head of each sash, whether sash are stationary or hinged (see detail, page 52).

Vertical members on centers not greater than 10 feet are required for support of sash and operating device. These may be angles, channels, or other members best adapted to structure. Pond Sash and Device effect saving in steel work by requiring fewest structural members.

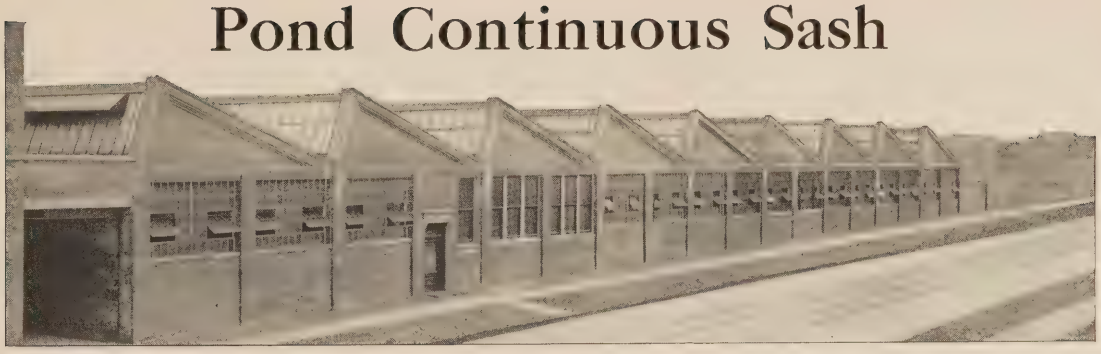
WORK NOT INCLUDED We submit drawings showing all punching of steel work necessary for Sash and Device. We do not furnish angles, Z-bars, channels or any structural steel, or do any punching of structural work. We do not include with the sash any flashings at head, sill or ends of sash, or any roof connections.

SPECIFICATION Specify Pond Continuous Sash made of solid rolled steel members of sizes shown on page 46; assembled without joints by oxy-acetylene welding; hung on heavy malleable iron hinges with ⅜-inch bronze pins; steel expansion joints between panels; glass to be ¼-inch thick, wire or plain as desired, bedded in special putty and held by copper glazing wedges. Sash with joints or internal surfaces of any kind will not be approved. Operated lines provided with storm panels and controlled by Pond Operating Device equipped with spiral and counterweights if required by length of lines.

COMPARISON We invite a critical comparison of both Pond Continuous Sash and Pond Operating Device with cheaper sash and devices. Compare the few heavy solid Pond Sash members and the one-piece jointless sash with sash having members built up from several thin sections and assembled to conceal surfaces subject to corrosion. Test Pond Operating Device for unequalled power and for construction which will give permanently satisfactory operation. You will be convinced of the real and permanent economy of Pond Continuous Sash and Operating Device.

SPECIAL DETAILS We make special details without charge adapted to your construction. Please send your preliminary plans, which will be returned promptly with our suggestions.

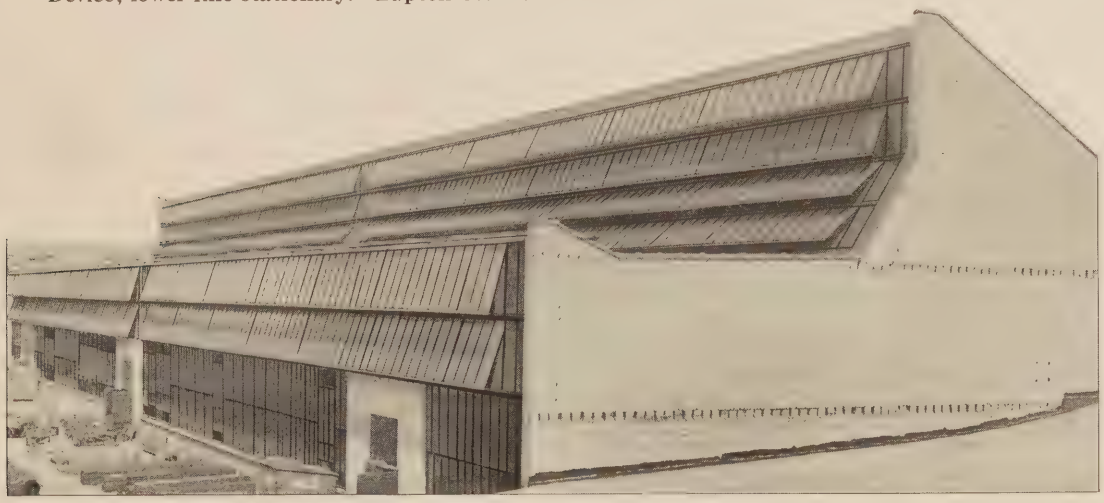
Pond Continuous Sash



Cleveland Engineering Company

Taylor Boggis Foundry Company
Cleveland, Ohio

Sawtooth lines of Pond Continuous Sash, upper line hinged and controlled by Pond Operating Device; lower line stationary. Lupton Steel Sash in side walls.



Mr. W. D. Price,
Supt. of Construction

International Harvester Co., Plano Works
West Pullman, Ill.

Lines of Pond Continuous Sash in sides of Pond Truss and at eaves of side wall, with Lupton Steel Sash, Counterbalanced Type, in lower side wall.

Senor Francisco Lopez Navarro
Engineer and Constructor

Central Moron Sugar Company
Havana, Cuba

This modern sugar factory is lighted and ventilated by Pond Continuous Sash, controlled by Pond Operating Device. Pond Sash is particularly adapted to buildings in tropical countries, where hurricanes are frequent and rainfall is heavy, because of the strength of the members, the welded assembly and the weather-proof feature of the sash.

Pond Continuous Sash

(Patents pending by Clarke P. Pond)

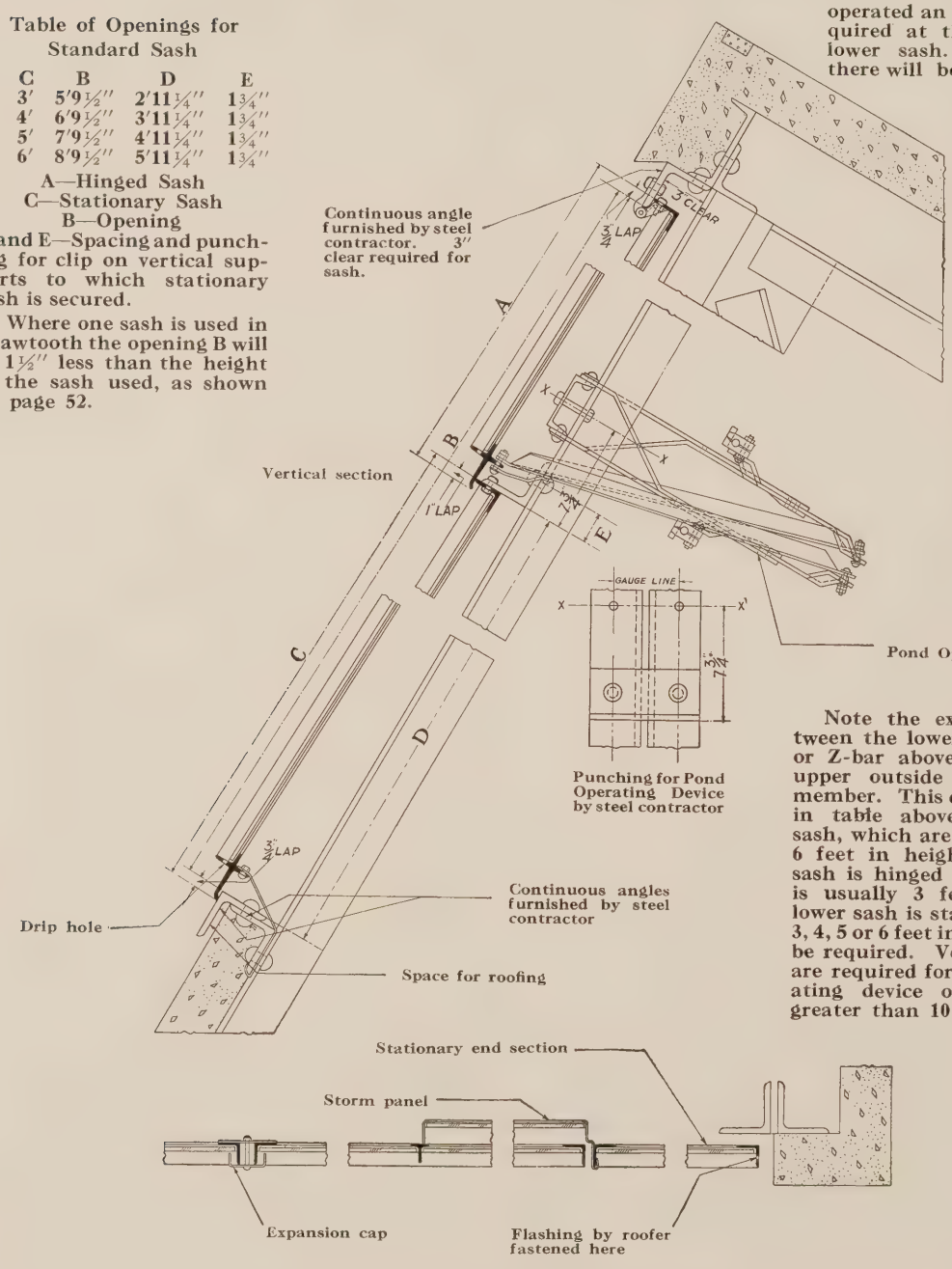
Applied to Sawtooth Construction or Sloping Surfaces

Table of Openings for Standard Sash

A	C	B	D	E
3′	3′	5′9½″	2′11¼″	1¾″
3′	4′	6′9½″	3′11¼″	1¾″
3′	5′	7′9½″	4′11¼″	1¾″
3′	6′	8′9½″	5′11¼″	1¾″

A—Hinged Sash
C—Stationary Sash
B—Opening
D and E—Spacing and punching for clip on vertical supports to which stationary sash is secured.

Where one sash is used in a sawtooth the opening B will be 1½″ less than the height of the sash used, as shown on page 52.



Horizontal section at end of line

If both lines of sash are operated an angle will be required at the head of the lower sash. In this case there will be two openings, B, the height of each being 1½ inches less than the height of the sash used.

For operated lines of Pond Continuous Sash in sawtooth or other sloping surfaces longer than fifty feet Pond Operating Device should be equipped with spirals and counterweights which offset load of sash.

Note the exact height between the lower edge of angle or Z-bar above sash and the upper outside corner of sill member. This distance is given in table above for standard sash, which are made 3, 4, 5 or 6 feet in height. The upper sash is hinged at the top and is usually 3 feet high. The lower sash is stationary, and is 3, 4, 5 or 6 feet in height, as may be required. Vertical supports are required for sash and operating device on centers not greater than 10 feet.

We do not furnish any steel work or flashings. All holes to be punched by steel contractor.

Pond Continuous Sash

Mr. W. C. Fronk
Architect

Hendee Manufacturing Company
Springfield, Mass.

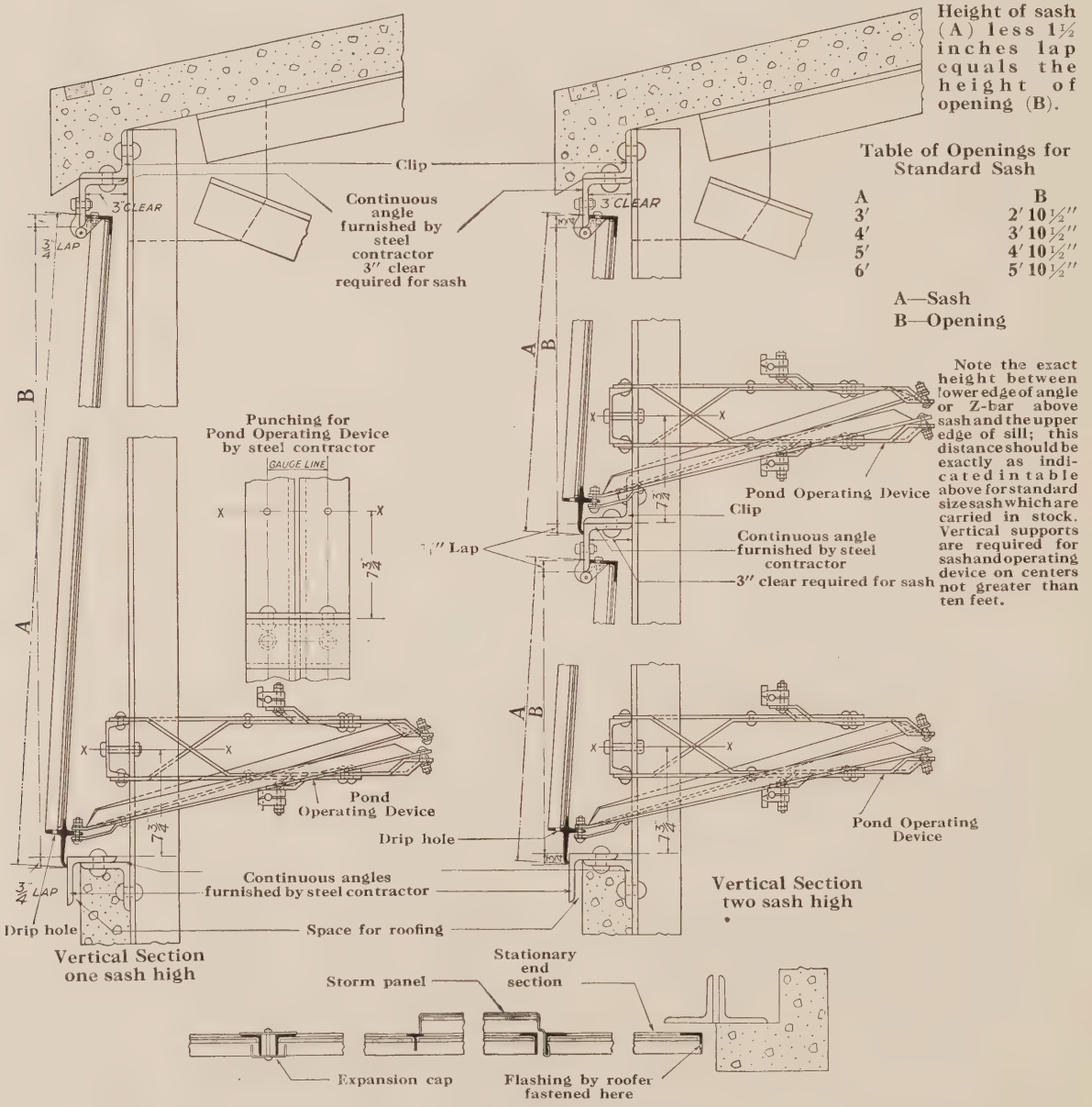
Sawtooth roof construction with lines of Pond Continuous Sash. Upper sash in each line is hinged and controlled by Pond Operating Device. Lower sash is stationary. Pond Sash is used in monitors of buildings in background. Pond Continuous Sash is weather-tight when open and roof ventilator may be had regardless of weather conditions. Lupton Steel Sash are used in side walls of buildings.

Pond Continuous Sash

(Patented by Clarke P. Pond, and patents pending)

Applied to Monitor or Vertical Surfaces

For operated lines of Pond Continuous Sash in monitors or other vertical surfaces longer than 100 feet, Pond Operating Device should be equipped with spirals and counterweights which offset load of the sash.



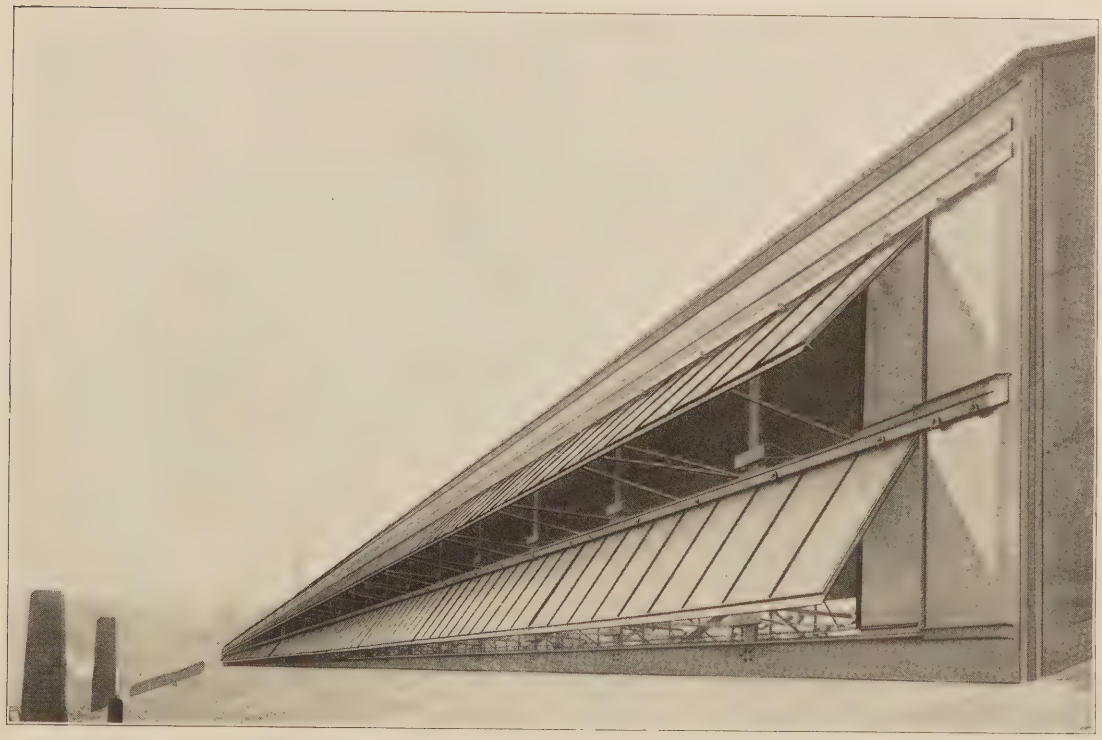
We do not furnish any steel work or flashing. All holes to be punched by steel contractor.

Pond Continuous Sash

Mr. I. F. Baker
Superintendent

General Electric Company
Everett, Mass.

Lines of Pond Continuous Sash controlled by Pond Operating Device in upper side and end walls and in monitor keep building free from heat and gases and supply even overhead light.



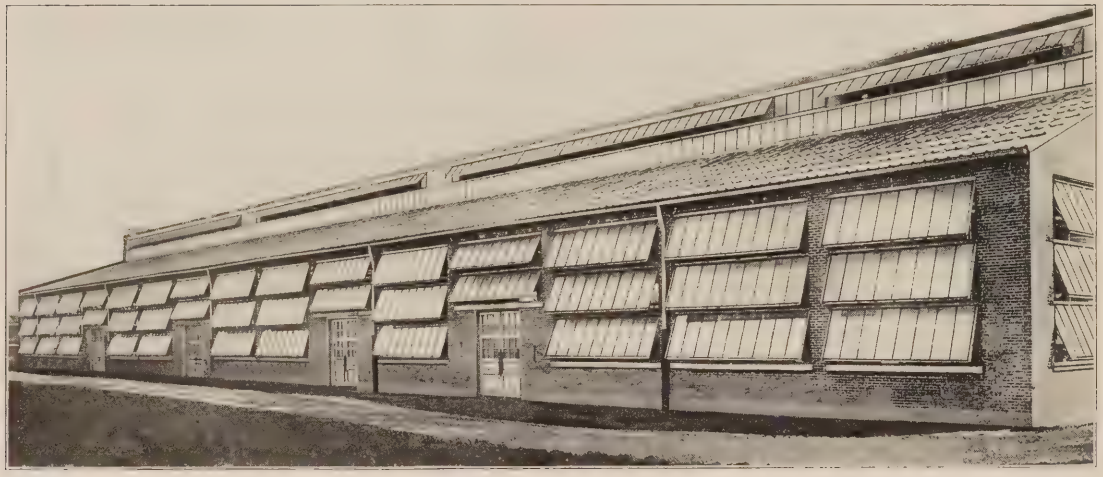
Mr. O. A. Eckerman
Architect

Union Malleable Iron Company, Foundry
East Moline, Ill.

Two lines of Pond Continuous Sash applied to monitor. Each line is hinged under a continuous angle which forms a hood at the top of the sash. At the end of the line the hinged sash laps over a stationary light or storm panel which prevents entrance of weather. Each line is controlled separately by Pond Operating Device. See detail, page 52.

Pond Continuous Sash

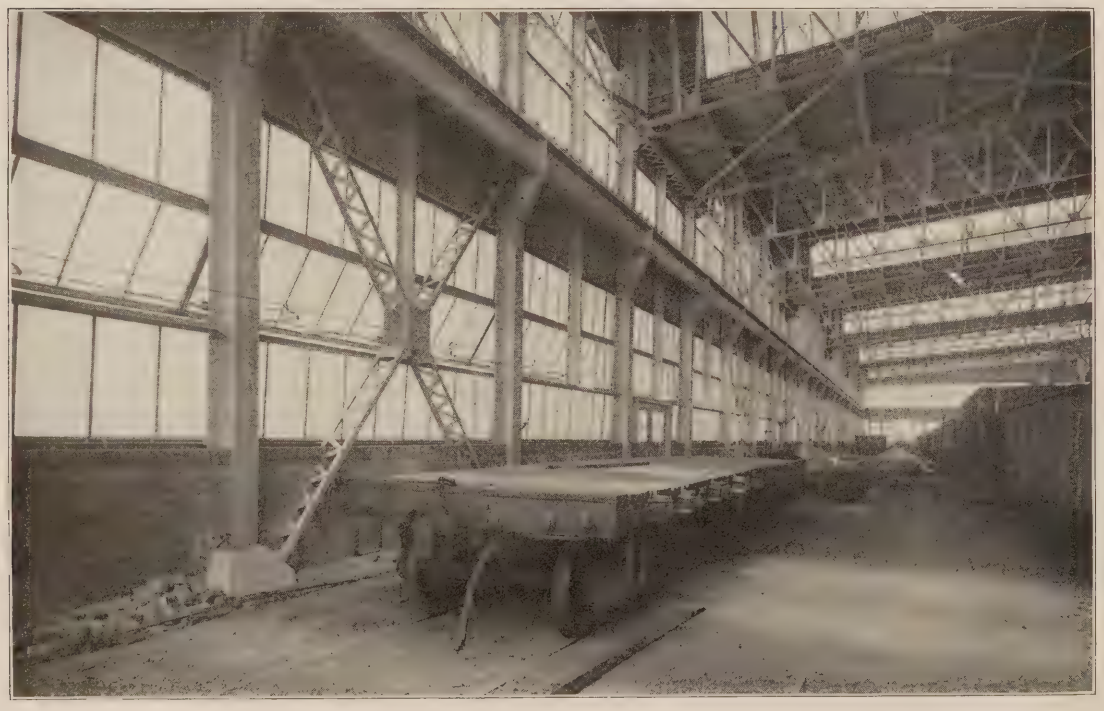
Applied to Side Walls



Messrs. Mills, Rhines, Bellman & Nordhoff
Architects

The Willys Overland Company, Forge Shop
Toledo, Ohio

Pond Continuous Sash, controlled by Pond Operating Device, used throughout for roof and side wall lighting and ventilation. Sash are weather-tight when open.



Mr. G. C. Cleveland
Chief Engineer

Lake Shore and Michigan Southern R. R. Shops
Ashtabula, Ohio

Pond Continuous Sash is used in side walls and monitors throughout building. Maximum ventilation is provided with protection from weather.

Pond Continuous Sash

Pivoted Type

COMPARISON

We make pivoted type only when required. Snow and rain strike sash and are blown over the top, while the hinged type is weather-tight when opened, and is easily controlled by Pond Operating Device with varying load of sash offset by spiral and counterweight. The cost of building is increased by the additional steel for the roof cantilever required for pivoted type. We can prove better ventilating results under all weather conditions with top hung Pond Continuous Sash. Let us show installations of both types.

FIRST INSTALLATION

The original installation of Pond Continuous Sash, Pivoted Type, was 70,000 square feet furnished by us in 1909 for the Pullman Company in their steel Freight Car Plant, Pullman, Ill.

SPECIFICATIONS

Malleable pivots with bronze pins are used, and all other features, including welded joints and sections, are same as for top hung sash shown on page 50.

Mr. W. E. Wood, Construction Engineer — Ford Motor Works, Detroit, Mich.

Extension to Machine Shop

Interior view of installation of Pond Continuous Sash, Pivoted Type

Pond Truss

Foundry and Forge Shop Type

(Patented by Clarke P. Pond)

INSTALLATIONS of Pond Truss in foundries, forge shops, glass factories, machine shops, power houses and steel mills have practically proven the scientific principles of design and conclusively shown in daily use under all weather conditions unusual results in light and ventilation.

Owners are so well satisfied that in a number of instances (in foundries, forge shops, glass factories and steel mills) old buildings have been remodeled and Pond Truss applied to reduce the tonnage cost by making it practical to operate the buildings under all weather conditions and secure maximum production from each workman.

DESIGN of Pond Truss is based on eliminating the unnecessary cross section of building, making the roof areas of such sizes, slopes and in such location as may be necessary to deflect gases toward sash, preventing down drafts and all reverse currents when sash are open. Sash are used in side walls and roof of proper type and construction to freely ventilate and light entire floor areas under all weather conditions.

Columns are located to suit the use of building and Pond Truss applied to these column centers, special drawings being made for each building.

Best results are obtained by using a single Pond Truss in buildings not exceeding 175 feet in width. Sash are located to introduce daylight early and late and avoid direct rays of sun at midday. Our drawings show application of roofing without metal flashings or gutters.

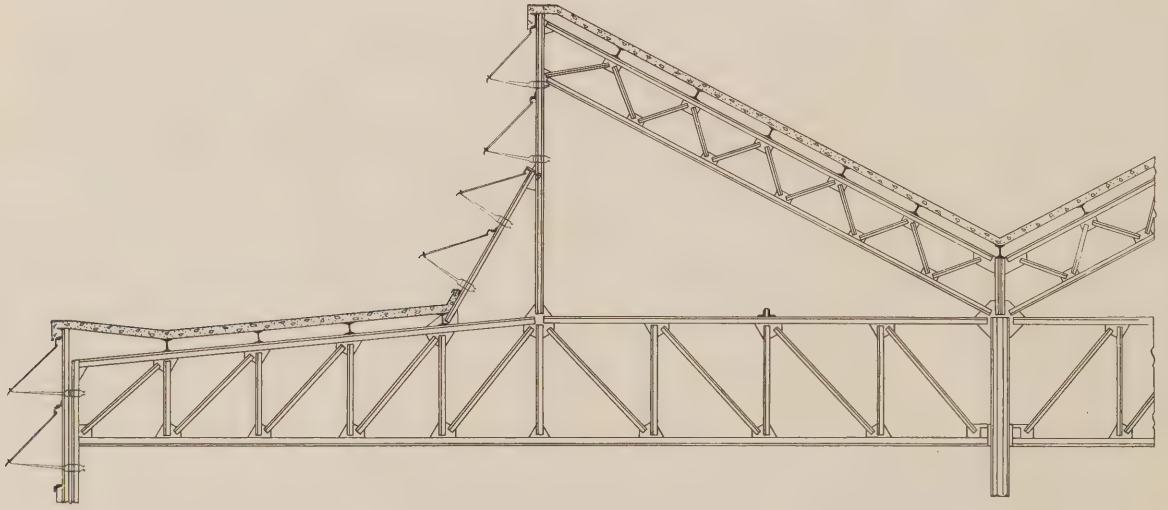
ECONOMY Our special designs for your building will convince you that Pond Truss is an economical form of roof lighting and ventilation that costs no more than any other roof construction of equal light and ventilation area. The improved workmanship and increased tonnage per man are the direct results of better working conditions.

APPLICATION We study your present plant, also sketches and description of proposed extension, and suggest in detail the particular form of Pond Truss (with auxiliary roof areas where buildings are over 175 feet in width). We will arrange for inspection of Pond Trusses in buildings nearest your requirements and will make convincing smoke test showing the unusual results in ventilation that are obtained by Pond Trusses.

Workmen at all times have plenty of daylight during working hours and fresh air at reasonable temperature during hottest weather.

Pond Continuous Sash (equipped with storm panels, making sash weather-tight when open) is always used in upper side walls and roof.

We will make special designs of Pond Truss to meet your requirements without charge.



Cross sections of Pond Truss are shown on page 60; views and general description pages 56 to 64, and additional views pages 67 and 70.

Pond Truss

Foundry and Forge Shop Type

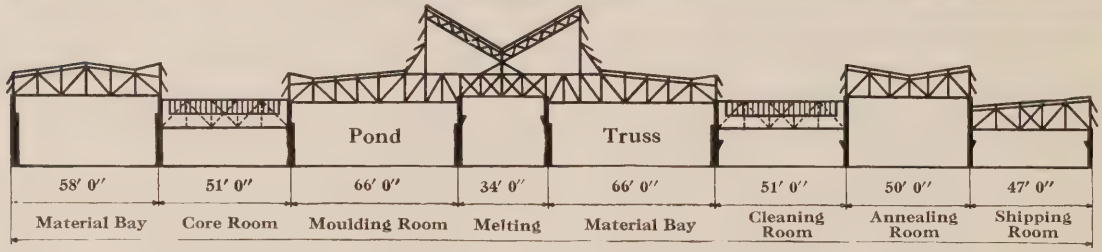
Lupton Factory, Philadelphia, Pa.

Exterior and interior side view of Pond Truss over Lupton Steel Sash Department, with lines of Pond Continuous Sash controlled by Pond Operating Device. Note internal slope of monitor roof which leads heat and gases directly to sash, and the open effect of the light members used in Pond Truss.

Pond Truss

Foundry and Forge Shop Type

(Patented by Clarke P. Pond)



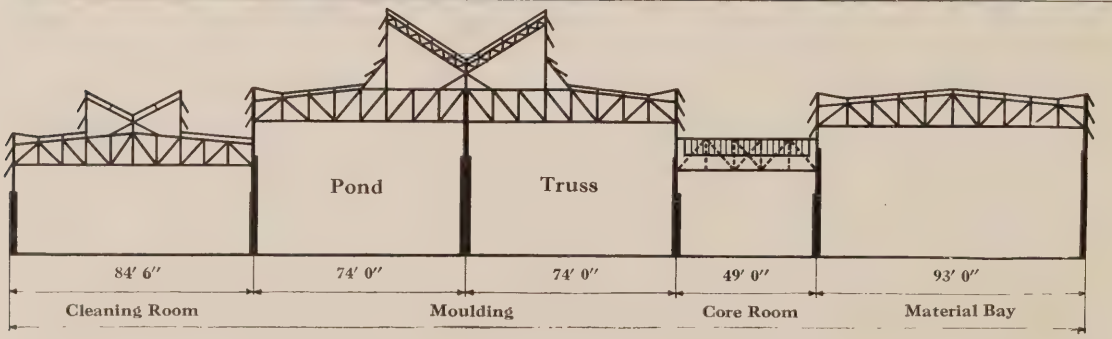
Building No. 22, Malleable Iron Foundry

Complete Unit, 423 by 800 Feet

Messrs. Harris & Richards,
Consulting Engineers and Architects

General Electric Co., Erie Works,
Erie, Pa.

We originated Pond Truss to meet the advanced requirements for daylight and ventilation of these two remarkable foundries. The inverted monitor roof and slope of main roof lines deflect gases and heat directly to lines of Pond Continuous Sash which are weather-tight when open. Daylight is distributed evenly throughout every part of the buildings; see interior views next page.



Building No. 18, Gray Iron Foundry

Complete Unit, 375 by 800 Feet

Pond Truss

Foundry and Forge Shop Type

General Electric Company, Building No. 22, Malleable Iron Foundry, Erie, Pa.
Messrs. Harris & Richards, Consulting Engineers and Architects

These views through length of and across building show perfect distribution of daylight. An inspection will convince you that Pond Truss will naturally ventilate foundries under all weather conditions.

Pond Truss

Foundry and Forge Shop Type

(Patented by Clarke P. Pond)

STANDARD DRAWINGS

Cross sections of five typical Pond Trusses with standard drawing numbers, shown on this page, illustrate typical applications of Pond Trusses to buildings of various proportions and uses. There are certain details of steel and masonry construction on all standard drawings that are recommended for general use as providing the best connection between roofing, masonry, steel structure and sash, but it is our intention to always supply special details to meet the requirements of each building, as outlined on page 56.

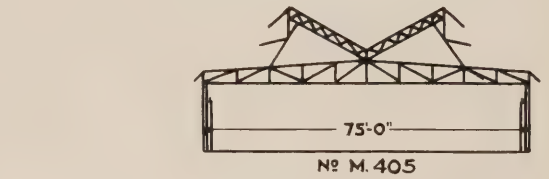
OWNER DETERMINES DIMENSIONS

The height to bottom chord of truss, location of columns, crane and all structural and mechanical features of the building below the bottom chord of the truss are determined by the owner or engineer, either before or after consultation with ourselves. We inspect your present plant and suggest your inspection of Pond Trusses in operated buildings that are nearest your requirements.

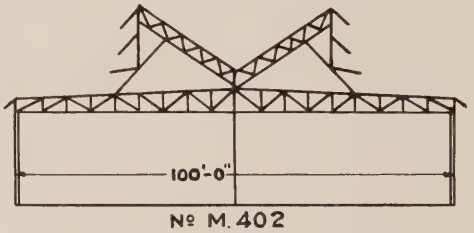
SERVICE

We assist architects, engineers and owners for lighting and ventilation, including all roof construction, sash area, sash operating device, steel doors and steel partitions, but do not design nor construct buildings.

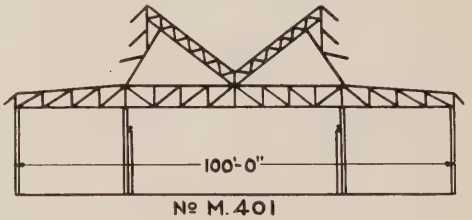
The instant adoption and wide use of Pond Trusses increase our reputation for products and sales service in advance of advertising statements.



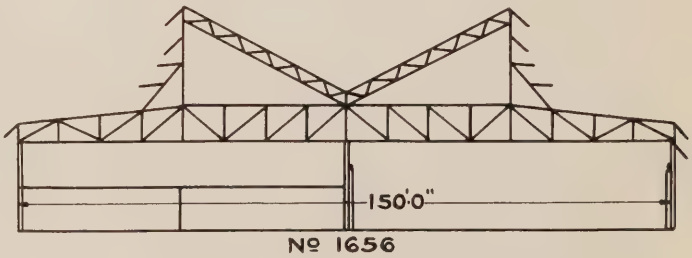
№ M. 405



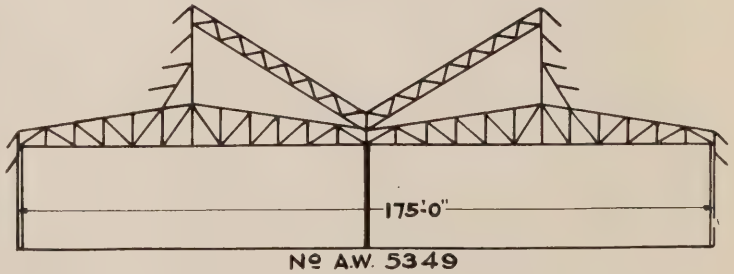
№ M. 402



№ M. 401



№ 1656



№ A.W. 5349

Pond Truss, Glass Furnace Type

(Patented by Clarke P. Pond)

Toledo Glass Company, Toledo, Ohio

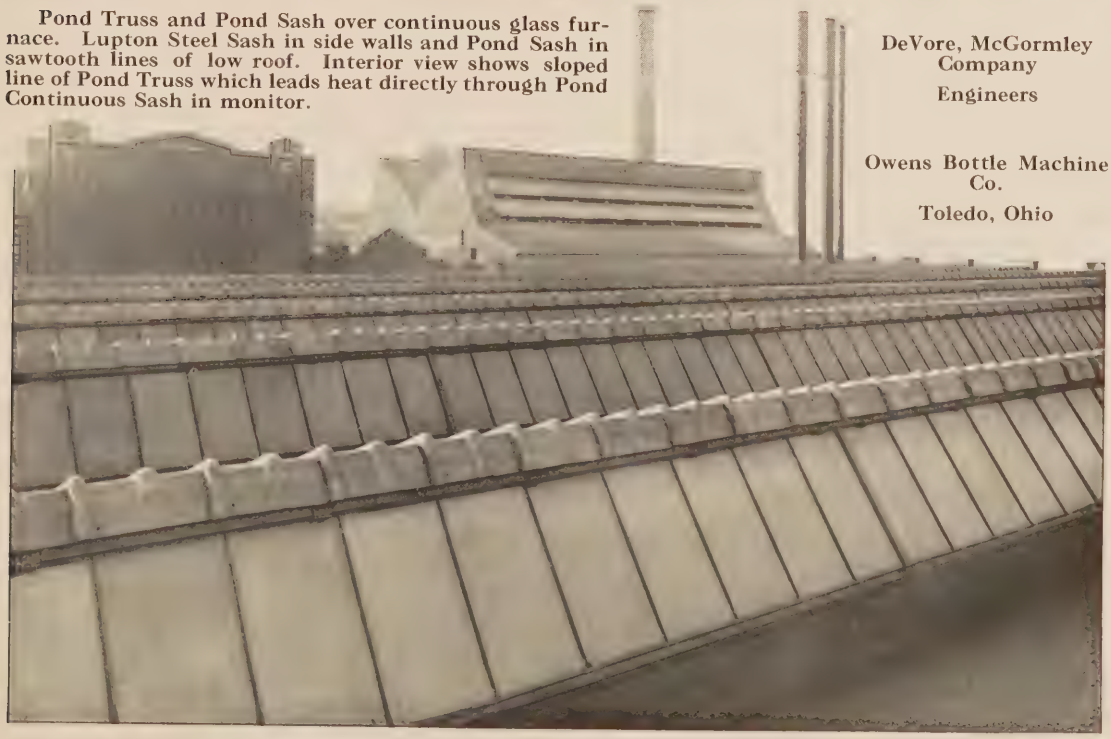
Pond Truss and Pond Sash over continuous glass furnace. Lupton Steel Sash in side walls and Pond Sash in sawtooth lines of low roof. Interior view shows sloped line of Pond Truss which leads heat directly through Pond Continuous Sash in monitor.

DeVore, McGormley Company

Engineers

Owens Bottle Machine Co.

Toledo, Ohio



Pond Truss

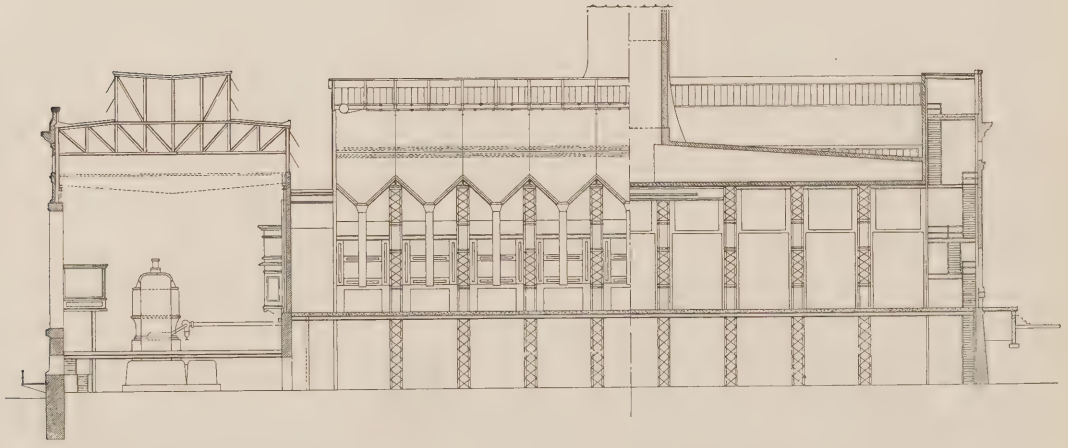
Power House Type

(Patents pending by Clarke P. Pond)

DESIGN

Pond Truss, Power House Type, is designed to introduce daylight and fresh air directly to the firing alleys, and to discharge immediately all heated gases outside of the building. Two roof levels are used; an upper roof over the coal bunkers and the transverse coal conveyors, and a lower roof over the boilers and the alley between the boilers and the Turbine Room, make it possible to use Pond Continuous Sash on the slope between the coal bunker walls and the boiler roof.

Smoke and unconsumed gases are discharged in the horizontal duct above roof which reduces the heat radiation in the boiler room about 80 per cent.



Cross Section through Turbine Room and Longitudinal Section through Boiler Room

Smoke and unconsumed gases are discharged directly into ducts above roof.

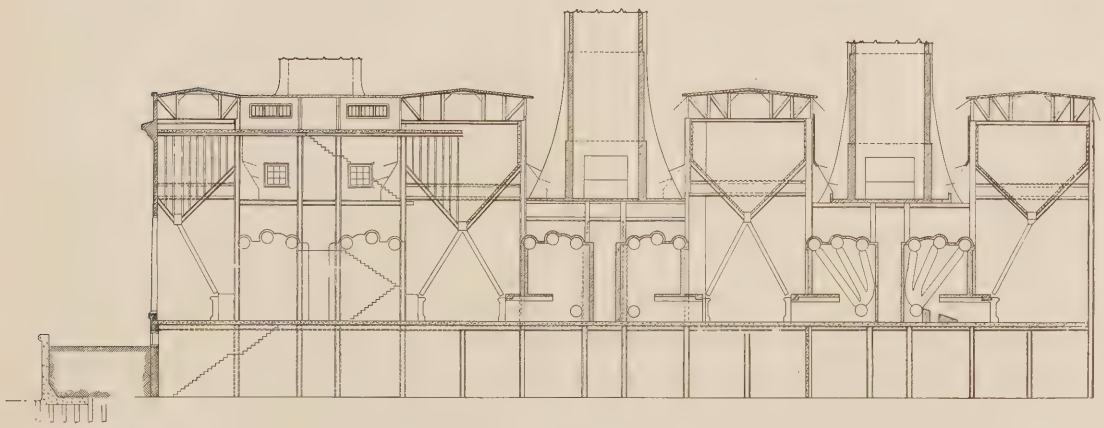
Pond Truss

Power House Type

(Patents pending for Clarke P. Pond)

ECONOMY Pond Truss, Power House Type, does not increase the first cost of the building; forced ventilation is not required. Daylight instead of artificial light in the firing alleys and better conditions for workmen are obtained by the use of this Truss.

APPLICATION We will adapt the design shown on this and the preceding page for use in Power Houses of any size. Small units with but one double firing alley or large units with a number of alleys are all easily lighted and ventilated. We will prepare details without charge. An inspection of the Cleveland Electric Illuminating Company, Lake Street Power Station, Cleveland, will show you more light and fresh air and less radiated heat than you will find in any other large Boiler Room.



Cross Section through Boiler Room

Lines of Pond Continuous Sash are placed directly above firing alleys.

Pond Truss, Power House Type

Mr. R. L. Cobb, Chief Engineer — Lake Street Power House
Cleveland Electric Illuminating Company, Cleveland, Ohio

The use of two roof levels permits the horizontal duct to stack to be placed on the roof over boilers; the lines of Pond Continuous Sash bring light and ventilation direct to the firing alleys as shown. In this boiler room there is maximum light and fresh air and minimum heat radiation.

Long Span Sawtooth Truss

DESIGN

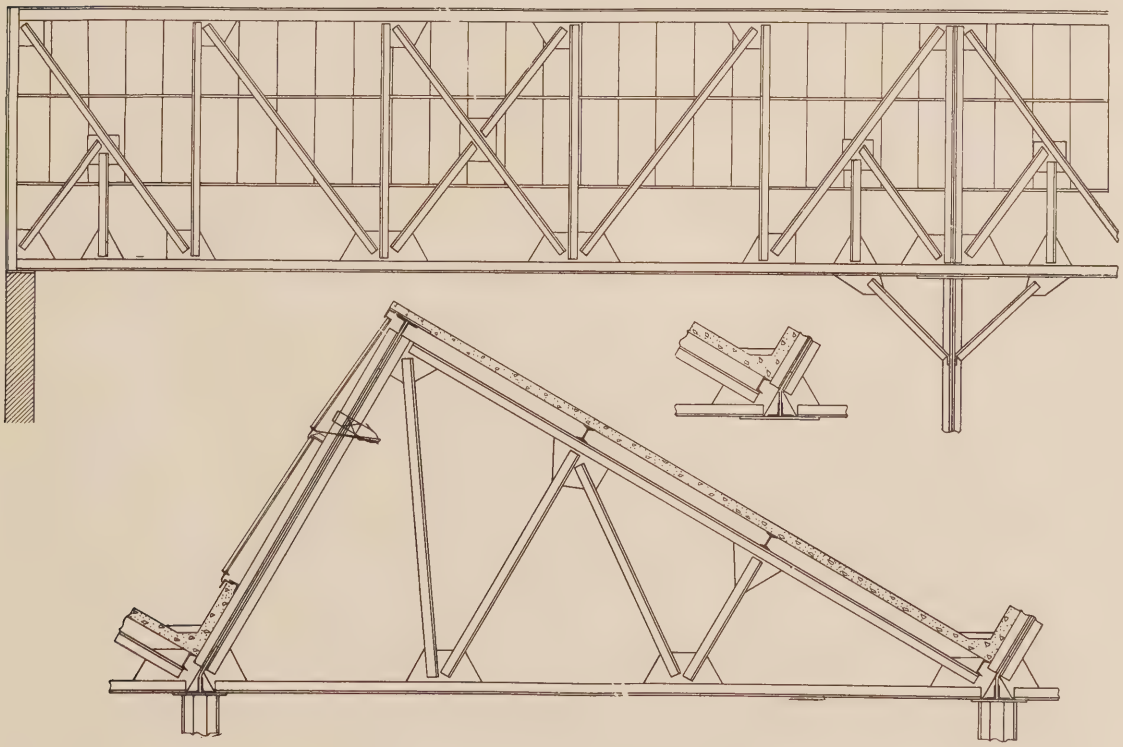
There are many textile mills and some machine shops where it is desirable to have only north light. For these buildings we have designed a long span sawtooth truss, inclined at 30 degrees, on which lines of Pond Continuous Sash are hung. The spacing of columns on the east and west lines is from 30 to 80 feet on centers, and 20 feet on the north and south lines. This type is more economical than the vertical truss, it interferes less with the light from sash, and gives increased head room.

Send floor plans, column spacing desired, height to bottom chord of truss; also state use of each part of the building and location of trolleys, line shafts, or specification of all extra loads on trusses. We will make suggestions which will be of service.

TEXTILE MILLS

Pond Continuous Sash is weather-tight when open and need never be closed on account of rain. Where humidors are required in factory processes we use bronze weather stripping to avoid leakage of air in Winter and also make special provision for carrying all condensation outside of the building. The Philadelphia Tapestry Mills, Philadelphia, have a satisfactory installation of Pond Continuous Sash where humidors are used.

Advise us of any special conditions that affect the air in your factory and our designs will be made to produce the best results, and specifications will be prepared to cover fully what is to be furnished. For this service there is no charge.



For details of Pond Contiuons Sash applied to sawtooth construction see page 50

Pond Operating Device

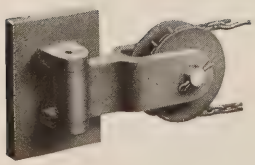
(Patented by Clarke P. Pond, and patents pending)

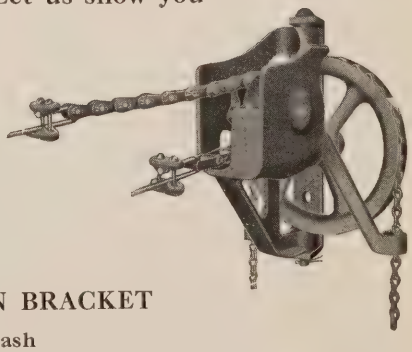
Pond Operating Device controlling line of Wood Sash

At the American Sheet and Tin Plate Company's plant, Gary, Ind., Pond Operating Device controls ten lines of wood sash, each 1050 feet long. Each line is easily operated its entire length by a hand chain.

Pond Operating Device is different in mechanical principle from any other operating device. The principle of tension transmission is right. Phosphor-bronze bearings and immersed gears insure permanent working conditions.

The most convincing feature about the Pond Operating Device is a pull on the operating chain. Let us show you the nearest installation.





OPERATING GEAR AND TRANSMISSION BRACKET

used at opposite ends of each line of sash

Pond Operating Device

Mr. O. A. Eckerman
Architect

Deere & Company, Forge Shop
Moline, Ill.

Interior view, showing side of Pond Truss with lines of Pond Continuous Sash. Note the extreme length of the sash lines which are controlled by Pond Operating Device.

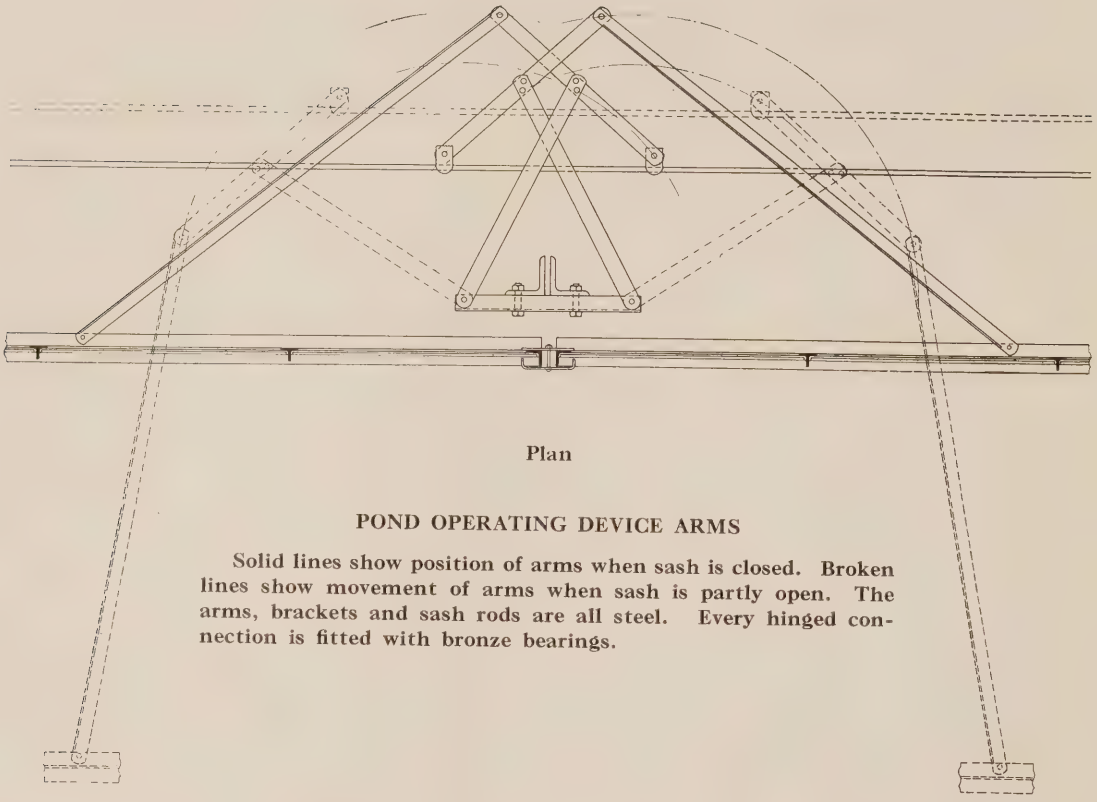
WIDE OPENING — The comfort of your workmen depends on ventilating area. The specification on page 72 shows standard openings for Pond Operating Device, which are about double the usual practice.

POWER — Worm and segment gear are all machine cut from solid steel and immersed in oil, usually operated as shown on page 66, and lines of Pond Continuous Sash 200 feet long, or pivoted sash 1000 feet long, are controlled with one gear.

TENSION TRANSMISSION — Hot headed steel rods with malleable barrel couplings and gun metal transmission chain, the complete line containing 14,000 pounds load in breakdown test.

BEARINGS — Bearings are phosphor-bronze and are immersed in oil. There is no friction in tension transmission.

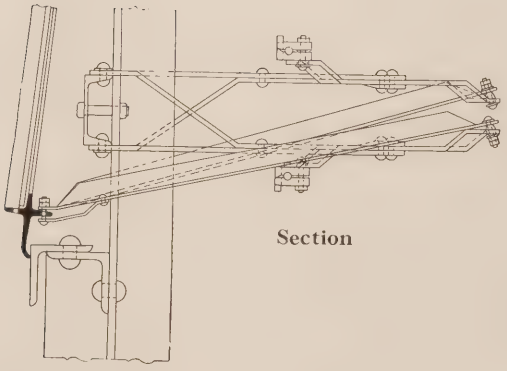
Pond Operating Device



Plan

POND OPERATING DEVICE ARMS

Solid lines show position of arms when sash is closed. Broken lines show movement of arms when sash is partly open. The arms, brackets and sash rods are all steel. Every hinged connection is fitted with bronze bearings.



Section

LEVERAGE INCREASES WITH LOAD

Application of power to the sash by compound levers of different designs for horizontal pivoted, top-hung and vertical pivoted sash, so that leverage is greatest at peak load in all types of sash.

ECONOMY

Pond Operating Device is a powerful, well designed, fool-proof machine; if occasionally painted it will last as long as the building without adjustment or relubrication. The worm gear locks sash in every position, preventing breakage of glass under all conditions. Let us submit sample parts for the criticism of your mechanical engineer and show you installations. You will be convinced of the greater durability and the mechanical and physical superiority of Pond Operating Device.

Pond Operating Device

SPECIAL CONDITION

The flexibility of tension transmission in Pond Operating Device is well shown in the standard application with horizontal arms and spirals and counterweights in opening the upper line of Pond Continuous Sash and its special application in attachment to vertical arm which operates the two lines of horizontal pivoted lower side wall sash with one gear.

Adjustable levers connect both sides of each sash opposite pivot, which eliminates lost motion that occurs when sash are operated together from tops of the ventilators. Each ventilator can be separately adjusted at both sides and each group of sash will be adjusted so that every sash is in proper alignment to prevent air leakage and loss of heat in the building. With the tension transmission, columns or other obstructions are easily avoided and long lines of sash operated in groups.

Philadelphia & Reading Railway Shops — St. Clair, Pa.
Mr. Clarke Dillenbeck, Architect

Mr. Ernest McGeorge
Consulting Engineer

Ferro Foundry and Machine Company
Cleveland, Ohio

Pond Operating Device, Type P Power, controlling the three panels of Pond Continuous Sash in each opening.

Pond Operating Device

SPIRALS AND COUNTER-WEIGHTS

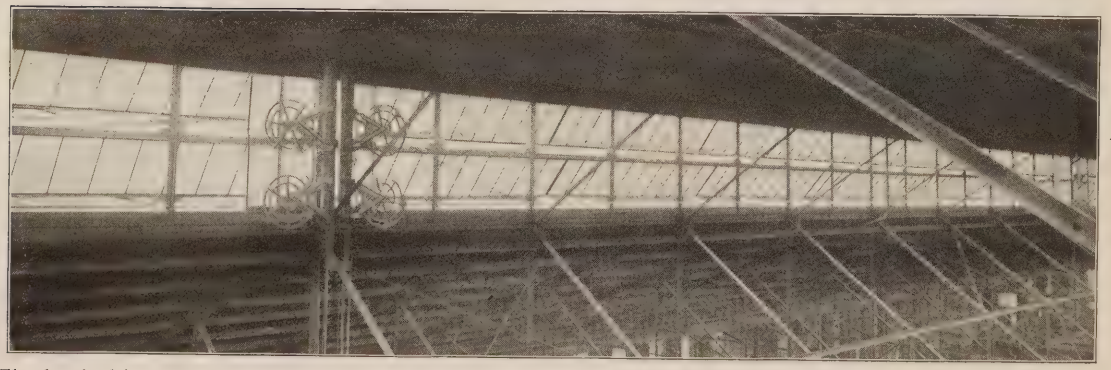
Spiral and Counter-weight are substituted for loose pulley opposite operating gear on vertical lines of Pond Continuous Sash over 100′ and on inclined lines over 50′ long. Horizontal or vertical pivoted sash are easily operated with one gear for the entire length of any building.

The leverage of counterweights increases in exact relation to the increasing load of top-hung sash and top-hung sash are exactly counterweighted throughout the entire movement.

The spirals and counterweights are used only to lift load of sash. Equally long lines can be operated without the use of spirals, but the load on hand chain is increased as the sash rises.

We recommend the spirals and counter-weights which entirely offset sash load.

Spirals and Counterweights applied to lines of Pond Operating Device controlling Pond Continuous Sash in the side of Pond Truss, Foundry and Forge Shop Type.



The load of long lines of Pond Continuous Sash in monitor is counterbalanced by the use of spirals and counterweights as shown.

Operating Device Analysis

COMPARISON You can easily determine the comparative value of sash operating devices by adding to the following condensed analysis any features of design, material and workmanship that you may find in any of the devices under consideration, classifying the good points in divisions and underscoring the best in each division. Use the device that has all the marked features.

Inspection of long lines of wide opening, top-hung, continuous sash (extreme loads are on sawtooth or other inclined sash) will prove the accuracy of the analysis. Note HEIGHTS of sash, LENGTH of line, SLOPE of sash when closed, and WIDTH of sash opening. Make separate comparisons for vertical and inclined sash.

GEAR TYPES

WORM AND SEGMENT gear, which locks sash in every position,	OR	Spur gear, which locks only by fastening hand chain.

MATERIAL

SOLID STEEL,	OR	Malleable iron; cast iron.

CASE

DUST PROOF, OIL FILLED,	OR	Open exposed.

WORKMANSHIP

MACHINE CUT,	OR	Cast.

TRANSMISSION

TENSION TRANSMISSION, which is many times stronger for its weight, less noticeable, entirely eliminates fixed brackets and rollers, which are unsightly and increase friction,	OR	Push and pull, the strength of which depends on the compressive strength of gas pipe minus loss on account of back thrust in the middle of each span where levers are attached. Torsion transmission, which is of such limited capacity that it is not adapted to long lines or heavy loads of sash.

LEVERAGE

LEVERAGE WHICH INCREASES WITH LOAD. When arms are properly designed for the heavy loads of top-hung continuous sash, the compound levers are so designed that a fixed amount of applied power on the transmission rod will produce a constantly increasing thrust on the arm which also compounds the increase of leverage as the sash opens and the load increases,	OR	Leverage which decreases as load increases. Compound levers that move toward a dead center lose power as load increases and sash opens.

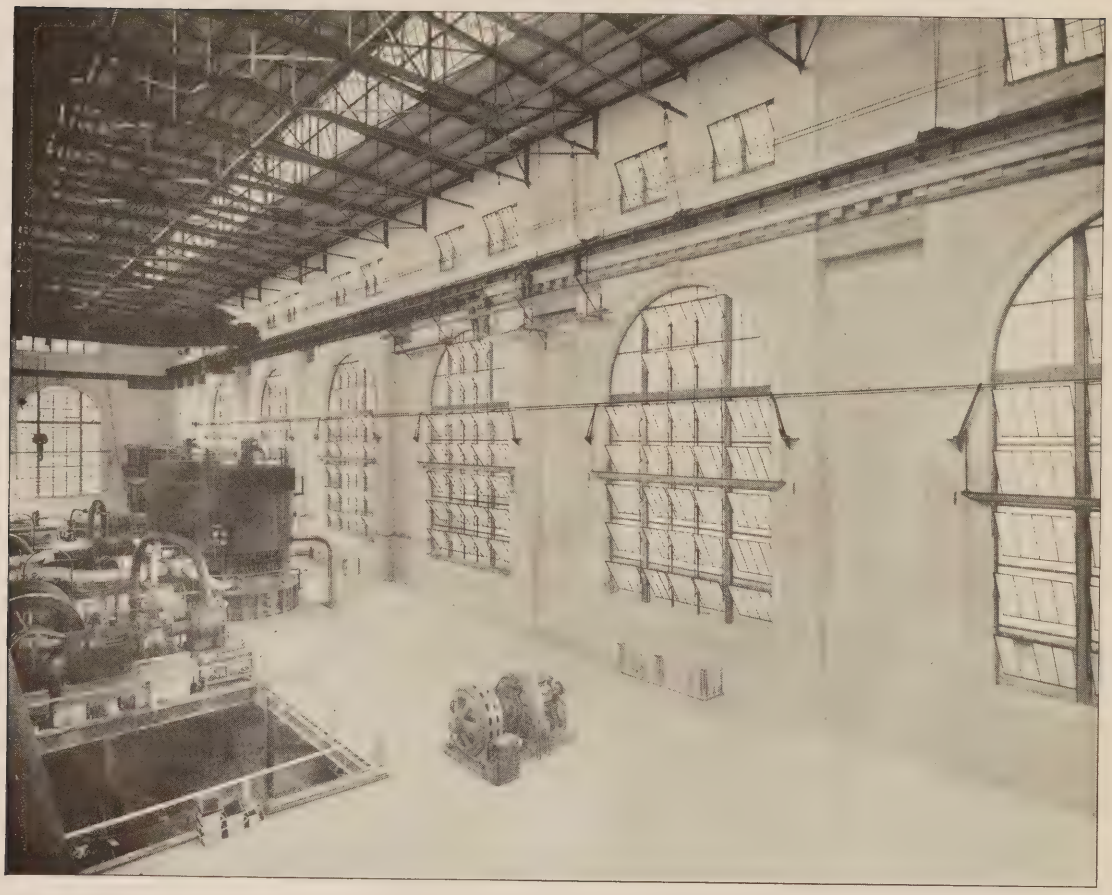
EASE OF OPERATION

SPIRALS AND COUNTERWEIGHTS entirely offset load of top-hung sash, using longer lines and fewer operations,	OR	Loads lifted by hand chain without counterweights.

INVESTMENT VALUE depends on the width of sash opening, least number of gears, ease of operation and cost of maintenance. Sash operating device that will open only 22 inches is not worth 50 per cent. of operator that opens 44 inches, because the reduced ventilating area affects comfort of your workmen and production of plant. The least number of lines save unnecessary loss of heat by more rapid control of ventilation. Correct mechanical principles of design, superior materials and workmanship make replacements unnecessary and reduce maintenance to occasional painting of operating device.

Pond Operating Device

(Patented by Clarke P. Pond, and patents pending)



Mr. R. L. Cobb, Chief Engineer

Lake Street Power House
Cleveland Electric Illuminating Company, Cleveland, O.

One hundred and eighty-six sash in six windows are all operated by one gear, with hand chain.

SPECIFICATION Specify Pond Operating Device, furnished and erected complete by David Lupton's Sons Company, with gears accurately cut from solid steel and immersed in oil; phosphor-bronze bearings in all hinged connections; power transmitted by tension; arms, brackets and sash rods all of steel accurately fitted with bronze bearings.

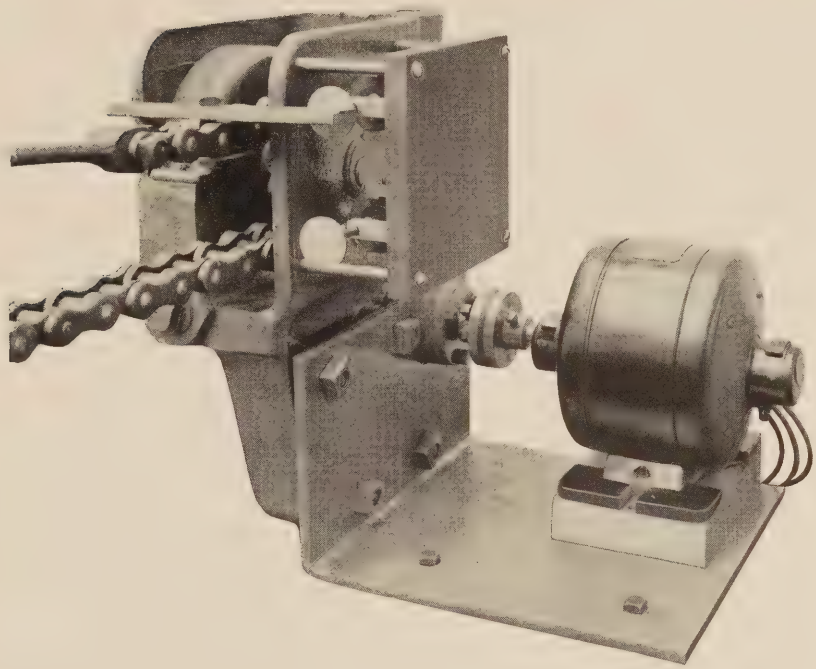
On all lines of vertical top-hung sash over 100 feet long and inclined sash over 50 feet long, spirals and counterweights will be used. Counterweights will be provided with slides and automatic safety device, so that if weight should fall it will be immediately locked.

ALTERNATE When it is desired to submit an alternate bid, all parts of the substitute operating device shall be furnished for comparison in every detail of design and mechanical construction with the operating device specified. A comparative physical test will be required to prove equal efficiency in lifting heavy loads and wide opening of sash, strength and durability of transmission, gears and all other parts, also friction loss and ease of operation.

WIDTH OF OPENING Horizontal Pivoted Sash, 60 degrees; Vertical Pivoted Sash, 90 degrees; Top-Hung Continuous Sash: 3-foot sash opens 27 inches; 4-foot sash opens 36 inches; 5-foot sash opens 41 inches; 6-foot sash opens 44 inches.

Pond Operating Device

Motor Driven



Pond Operating Device, Motor Driven Power, Automatic Cut-Out in Both Directions. See Pages 29, 74 and 75.

SPECIFICATION POND OPERATING DEVICE, MOTOR DRIVEN

Specify Pond Operating Device, Motor Driven, when it is desired to operate many sash quickly (as in a foundry, to prevent loss of heat after pouring) or on account of sudden storms.

Where noted on plans, Pond Operating Device, Motor Driven, with compound ball-bearing worm gears accurately cut from solid steel, and immersed in oil, shall be used. The special high-starting torque motor shall be enclosed in a dust-proof case. The automatic cut-out, which limits operation of sash in both directions, shall be adjusted to positively stop gears without strain on the operating device.

Pond Operating Device, including gears, cut-outs and motors, shall be erected complete by David Lupton's Sons Company and guaranteed against defects of design, material or workmanship for three years. The electrical contractor shall furnish and erect standard double-throw switches where required and do all wiring to motors and automatic cut-outs.

DETAILS

Consult us before specifying size of motors and we will make, without charge, details of operators to meet your requirements, which results in reducing cost of installation. Where practical use 110- or 220-volt, three-phase, 60-cycle A. C. motors.

Pond Operating Device
Motor Driven

Stone & Webster Engineering Corporation
Constructing Engineers

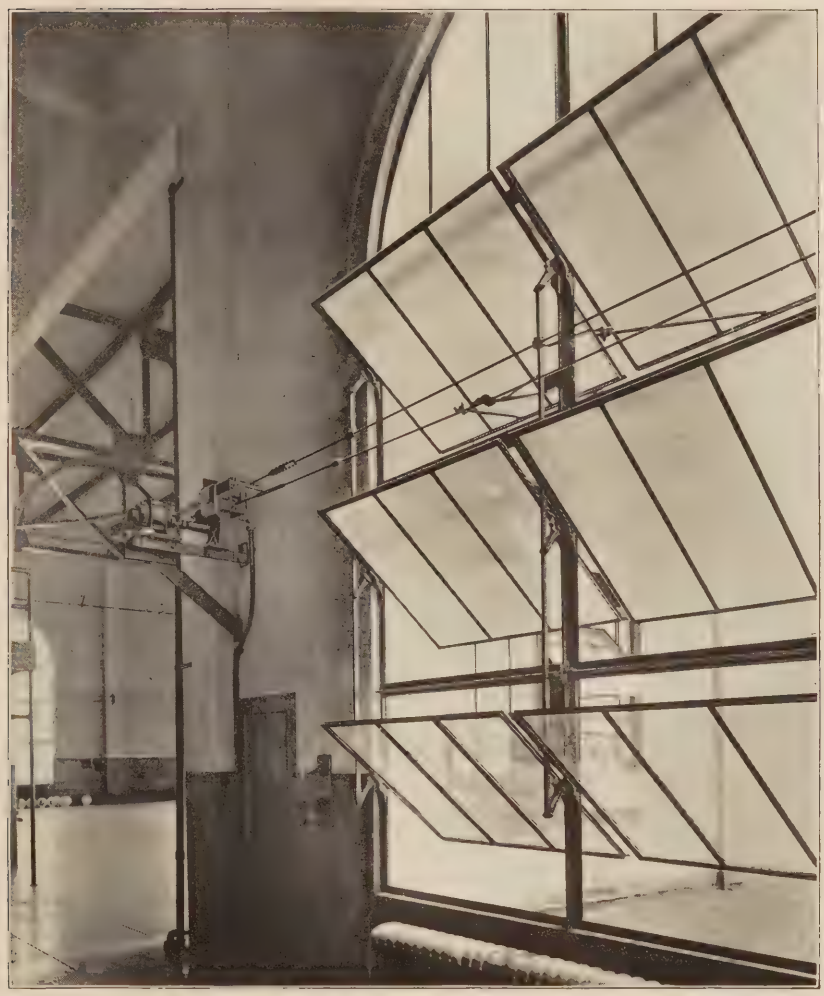
Mississippi River Power Company
Keokuk, Iowa

All Lupton Steel Sash, Power House Type, in the large openings on this elevation are controlled simultaneously by Pond Operating Device, Motor Driven. The smaller openings, which are filled by Lupton Steel Sash, Packard Type, are also operated by Pond Operating Device, Motor Driven. The transmission line is placed behind the crane girder, as shown in the interior view.

It is impossible to damage the motor driven Pond Operating Device by leaving switches in position, as the automatic cut-out limits the operation in either direction.

Pond Operating Device

Motor Driven



Motor Driven Power of Pond Operating Device controls three lines of Lupton Steel Sash. Note the heavy adjustable brackets and arms connecting ventilators.

GUARANTEE

We guarantee Pond Operating Device when erected by us to be satisfactory to the architect, engineers or owners and agree to make good any defect in material or workmanship within three years from completion of our contract; this guarantee does not cover loss or damage from fire, lightning or other cause beyond our control.

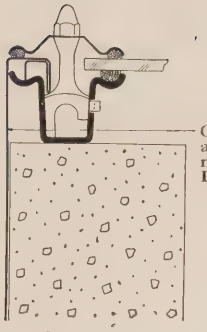
SERVICE

We will solve your sash operating device problems and furnish special details, which are made without charge, to meet your requirements. Where cranes or other obstructions are adjacent to the sash it is to our mutual advantage that preliminary drawings be sent us, which will be returned promptly with our suggestions.

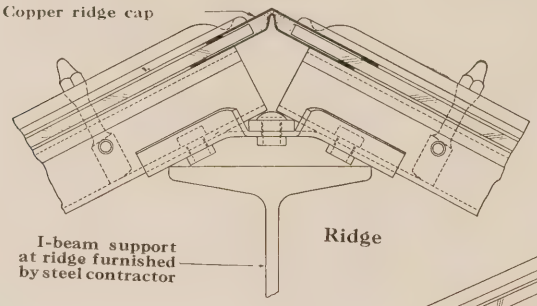
Lupton Rolled Steel Skylight

(Patented by Joah Brogden)

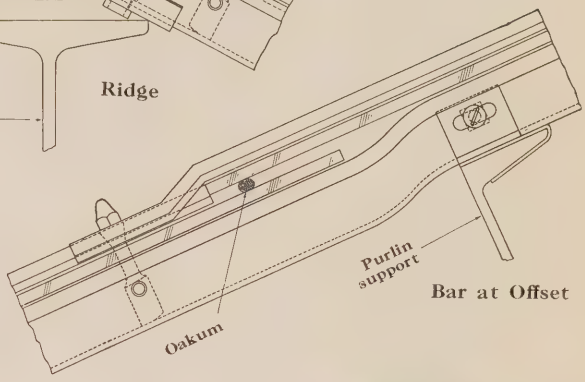
We furnish copper curb apron, but do not furnish any flashings or roof connections



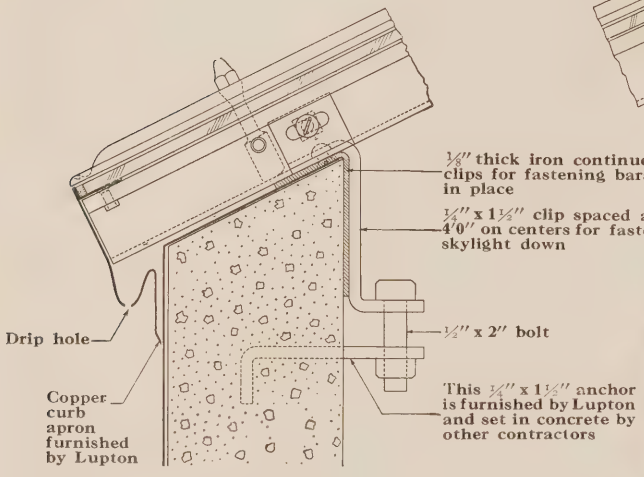
Side Curb



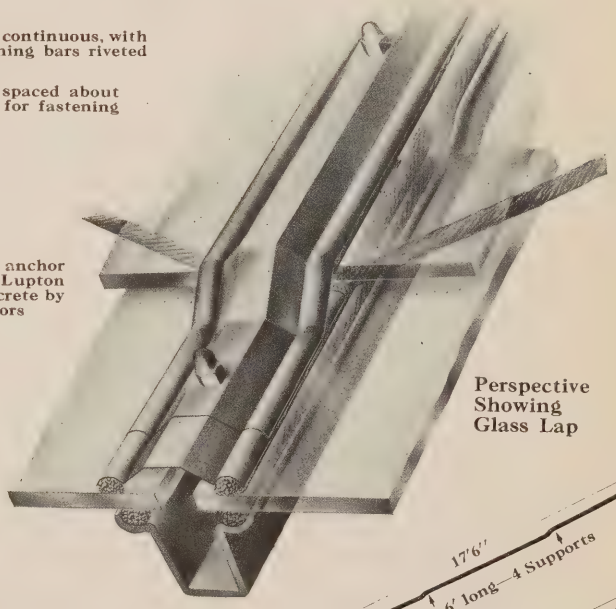
Ridge



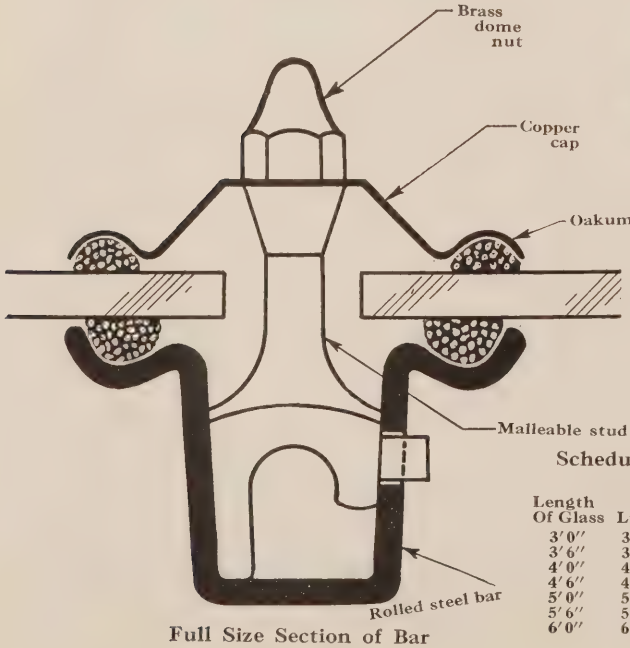
Bar at Offset



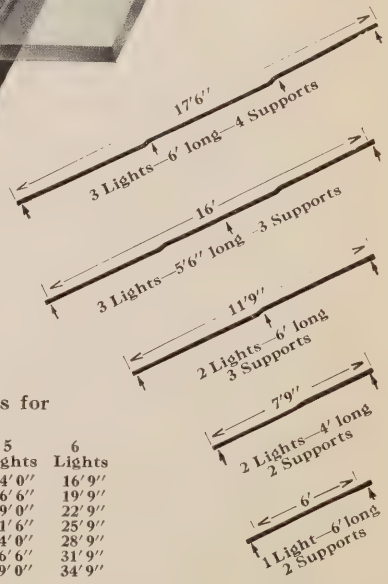
Lower Curb



Perspective Showing Glass Lap



Full Size Section of Bar



Schedule Showing Length of Bars for Different Sizes of Glass

Length Of Glass	1 Light	2 Lights	3 Lights	4 Lights	5 Lights	6 Lights
3′0″	3′0″	5′9″	8′6″	11′3″	14′0″	16′9″
3′6″	3′6″	6′9″	10′0″	13′3″	16′6″	19′9″
4′0″	4′0″	7′9″	11′6″	15′3″	19′0″	22′9″
4′6″	4′6″	8′9″	13′0″	17′3″	21′6″	25′9″
5′0″	5′0″	9′9″	14′6″	19′3″	24′0″	28′9″
5′6″	5′6″	10′9″	16′0″	21′3″	26′6″	31′9″
6′0″	6′0″	11′9″	17′6″	23′3″	29′0″	34′9″

Arrows show position and number of supporting members necessary for different lengths of bars. These members are to be furnished by other contractors.

Lupton Rolled Steel Skylight

(Patented by Joah Brogden)

BAR Lupton Rolled Steel Skylight Bar is one-eighth inch thick. Its peculiar shape successfully resists vibration. The inside of the bar is protected from corrosion by a dead-air space. The outside is readily accessible for painting. The bars are offset where required for glass lappage. There are no cross-bars.

CAP The cap is made of 16-ounce cold rolled copper. It is offset where required in the same manner as the bar. Malleable studs secured to the bar pass through the cap and are held at the top by dome nuts of brass. The curb aprons are also copper. All parts exposed to the weather are, therefore, non-corroding metals, copper and brass. Lupton Rolled Steel Skylight does not need renewing or repairing—an important feature from a standpoint of maintenance.

OAKUM Special heavily saturated oakum strands are used for glazing. These give a double connection between the glass and the metal above and below, and offer an impervious barrier to the entrance of rain or snow water.

METHOD OF GLAZING The glass is set between resilient cushions of continuous oakum strands, one above and one below the glass. It is thus held doubly protected from contact with the metals of the bar and the cap, and is free from danger of breakage by vibration. The strands allow the glass free play under expansion and contraction movements, thereby doing away with the glass breakage so common with skylights in which the glass is held tight by means of putty. The elimination of glass breakage from vibration, expansion or contraction commends Lupton Rolled Steel Skylight to the owner who pays the maintenance bills of a building.

CONDENSATION The method of caring for condensation is particularly effective and does away with gutters, which soon fill with dust and invite corrosion. The condensation follows the slope of the glass until the lap between two lights is reached. Here a strand of oakum is placed between the glass, sloping down from a high point midway between the two bars, each end of the strand terminating in a bar. The condensation following either slope of the oakum strand is carried into the interior of the bars down which it passes and drains on the roof through holes directly under the bars in the curb apron.
The perspective drawing on page 76 shows in part the arrangements of the cross strands of oakum at the glass lap. It also shows the gutter formed by the bar down which the condensation drains. The copper apron is shown in the sectional detail through the lower curb.

LIGHT Lupton Rolled Steel Skylight offers the least possible obstruction to the entrance of light. There are no cross-bars; where such bars usually occur the glass is lapped, with a strand of oakum set between the lights.

TYPES Lupton Rolled Steel Skylight is adapted to any type of skylight construction. Its essential features and thorough efficiency may be had in single pitch, double pitch, hipped, saw-tooth, double glazed, or any other practical skylight construction.

ERECTION An interesting feature of the Lupton Rolled Steel Skylight is the fact that it can be erected by ordinary mechanics. No sheet-metal workers' tools are required for its erection. All members are carefully cut to exact size, the bars and caps are offset as required, and the parts are shipped from the factory ready for quick and easy assembling.

MAINTENANCE The one-piece rolled steel bar, the non-rusting metals where exposed to the weather, the glass doubly protected from contact with the metal—are points in Lupton Rolled Steel Skylight construction which reduce the cost of maintenance to the minimum.

DRAWINGS We will furnish on request drawings showing adaptations of Lupton Rolled Steel Skylight to any of the ordinary types of construction or to meet unusual conditions.

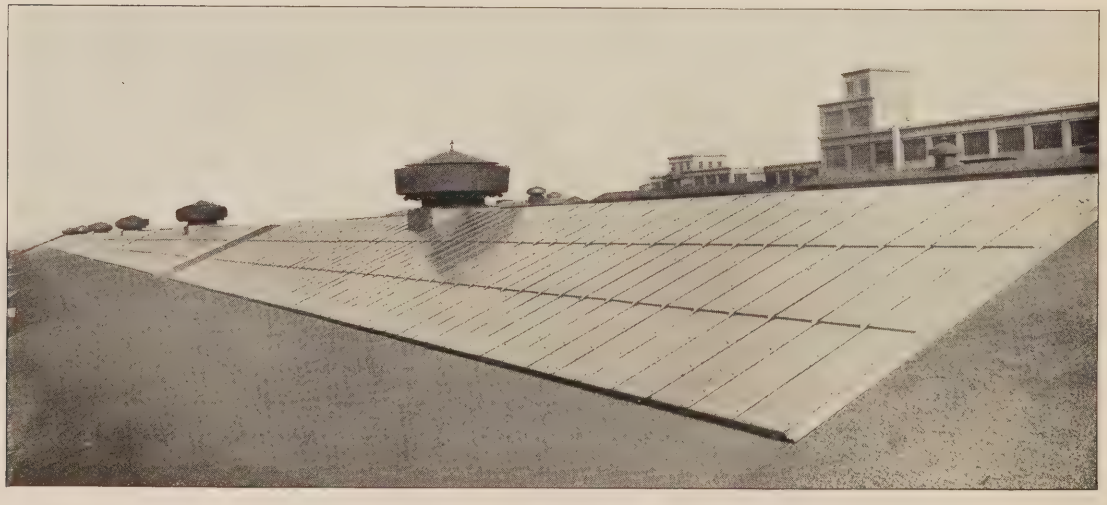
SPECIFICATION Specify the Lupton Rolled Steel Skylight furnished by David Lupton's Sons Company and erected under the supervision of the general contractor.

Lupton Rolled Steel Skylight

Messrs. Sargent & Lundy
Engineers

Atlantic City Electric Company, Power House
Atlantic City, N. J.

Lupton Rolled Steel Skylight, four-hipped type, with lines of Pond Continuous Sash. Sash in sides are hinged and controlled by Pond Operating Device. This use of Lupton Skylight and Pond Sash is particularly effective in giving light and ventilation in courts and areaways.



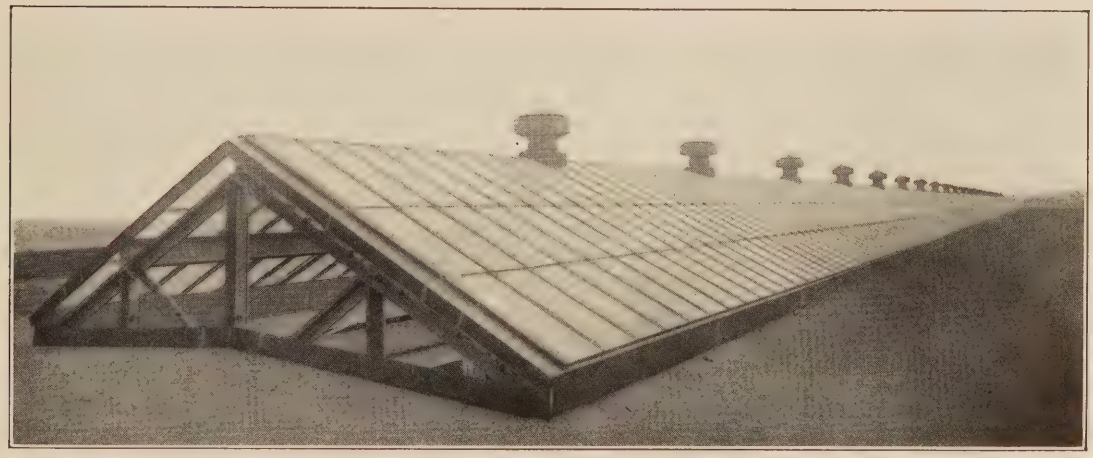
General Electric Company, Building 54
Schenectady, N. Y.

Lupton Rolled Steel Skylight, double pitch type, on ridge of roof. Bars are offset and lights of glass are lapped—no cross bars are used.

Lupton Rolled Steel Skylight

Lupton Factory, Philadelphia, Pa.

Lupton Rolled Steel Skylight, double pitch type. All metals exposed to the weather are non-corrosive copper and brass.



Mr. C. K. Lawrence
Chief Engineer

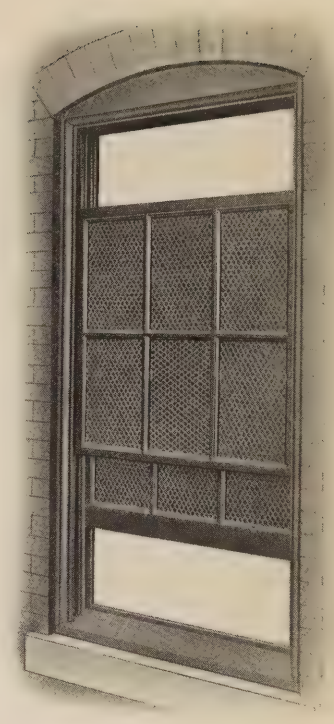
Central of Georgia Railroad, Erecting Shop
Macon, Ga.

Lupton Rolled Steel Skylight, four hundred and eighty-four feet long; twelve feet six inches on each slope. The unfinished end shows the structural work supporting the skylight.

Lupton Sheet-metal Fire-proof Window

HOLLOW SHEET METAL GLAZED WITH WIRE GLASS

Keystone metal, a copper bearing open hearth steel, is used in all galvanized Lupton Sheet-metal Fire-proof Windows. This metal offers a particularly successful resistance to corrosion and to the action of gases and fumes.



Standard Type A Window
Double-hung, Non-reversible Sash

Directions for Measuring Standard Type A

LIGHT AREA First, determine the out-to-out glass dimensions of window based on the size and the number of lights desired, adding ¼ inch to the height and width of each light for clearance. Then arrive at the size of wall-opening, as follows:

WIDTH OF WALL-OPENING To total glass width add 5¾ inches, this being twice 2⅞ inches, the space each side of the glass which is occupied by sash- and frame-members in this type of window.

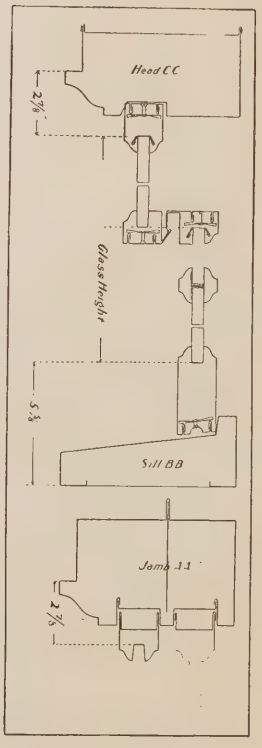
HEIGHT OF SQUARE-HEAD OPENING To total glass height add 8½ inches, this being 2⅞ inches plus 5⅝ inches, the spaces respectively above and below the glass which are occupied by the sash- and frame-members in this type of window.

EXAMPLE Thus, a Type A Lupton Window of twelve lights of a size 12 by 16 inches would require a wall-opening of a width 42½ inches and a height 73½ inches.

For example:

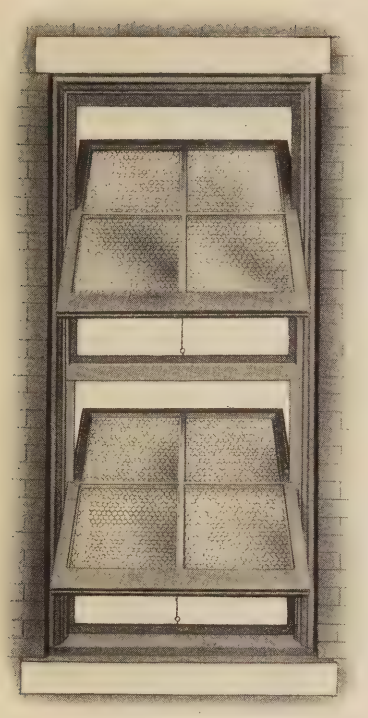
12¼″×3+5¾″=42½″ (width)

16¼″×4+8½″=73½″ (height)



SEGMENT HEADS For segment head add spring of segment to height obtained as above. The radius should be specified; in the absence of definite information it will be made to equal the width of wall-opening.

SIZES ABOVE STANDARD Heavier sash-rails are recommended for windows over 5 by 8 feet. To compute the opening for Type A window with the heavier sash add 1¼ inches to the width and 3⅜ inches to the height, as obtained above. Illustrations in this catalog are based on standard size sash-rail. The increased width and height are in excess of the standard.



Standard Type I Window
Upper and lower sash pivoted

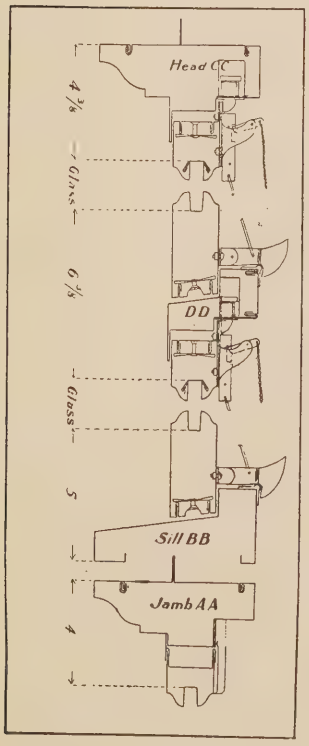
Lupton Sheet-metal Fire-proof Window

Directions for Measuring Standard Types G, H, I and L

LIGHT AREA — After determining total glass width and height, obtain the size of wall-openings, as follows:

WIDTH OF WALL-OPENING — To total glass width add 8 inches, this being twice 4 inches, the space each side of the glass which is occupied by sash- and frame-members in Types G, H and I.

HEIGHT OF SQUARE-HEAD OPENING — To total glass height add 15¾ inches, this being 4⅜ inches plus 6⅜ inches plus 5 inches, the spaces respectively above, between and below the glass which are occupied by the sash- and frame-members in Types G, H and I.



EXAMPLE — Thus, a Type G, H or I Lupton Window of eight lights of a size 12 by 16 inches would require a clear wall-opening of a width 32½ inches and a height 80¾ inches.

For example:

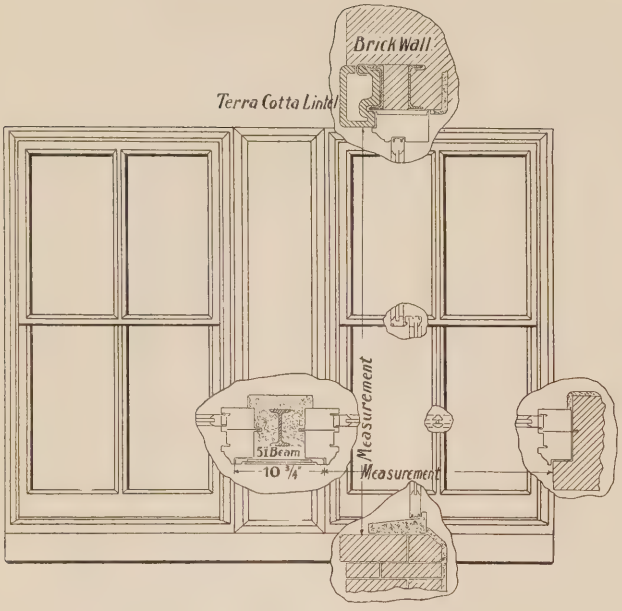
12¼″×2+ 8″ =32½″ (width)

16¼″×4+15¾″=80¾″ (height)

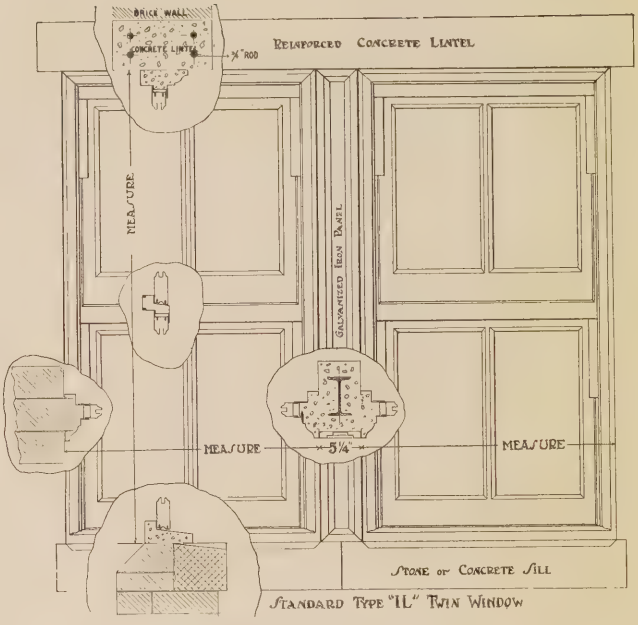
SEGMENT HEADS — For segment head add spring of segment to height obtained as above. The radius should be specified; in the absence of definite information it will be made to equal the width of wall-opening.

COMPARISON — Pivoted windows are about 30 per cent. cheaper than sliding sash.

Lupton Sheet-metal Fire-proof Window



Standard Type A Window



Standard Type I Window

The drawings show the correct installation of frames and mullions. Mullioned construction is not a part of the windows. The reinforcing members should be installed as the building is erected.

UNDERWRITERS' RULES FOR MULLIONED WINDOWS Mullioned windows should be constructed strictly in accordance with the Underwriters' requirements: Rule 19—Mullioned Windows (Adopted May, 1906).

a. Where openings are in excess of 5 by 9 feet, the metal frames containing the sash or glass to be reinforced at every point of division by I-beams thoroughly protected by approved fire-proofing.

b. I-beams to be securely fastened into the brickwork, proper allowance being made for expansion of the beams when heated.

In new buildings the reinforcing members should be installed as the building is erected.

c. The depth of the I-beam to be not less than 5 inches. This should be increased where the openings are in excess of 9 feet.

d. I-beam to be provided with at least 2 inches of tile, concrete or other approved material on the flanges and at least 2½ inches next to the web. The amount of fire-proofing next to the web should be increased on large beams.

e. Metal frames to be securely attached to the reinforcing members.

In most cases the reinforcing members should be thoroughly enclosed by the metal parts of the frames, care being taken to rivet or otherwise fasten the parts at points of junction so as to resist fire. Purely ornamental parts may be fastened by soldering.

We advocate the use of single openings rather than mullioned windows.

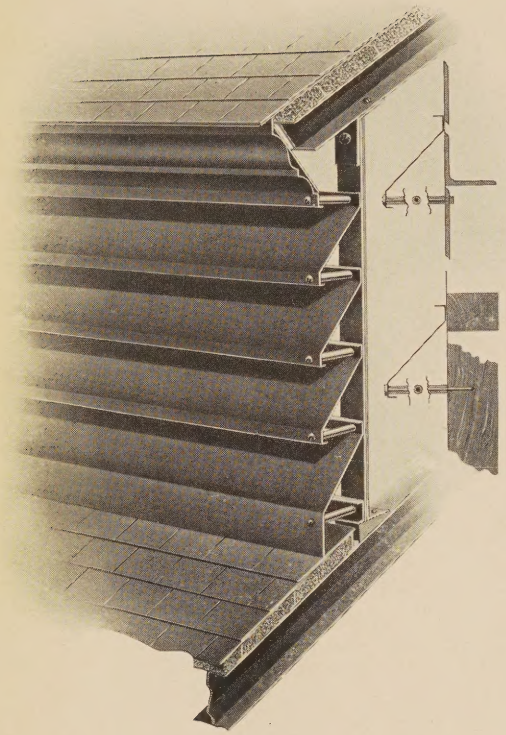
STANDARD TYPES

Type A—Double-hung, non-reversible sashes.
Type C—Self-balanced sashes, one hung on the other.
Type F—Stationary sash.
Type G—Stationary lower, pivoted upper sash.
Type H—Pivoted lower, stationary upper sash.
Type I—Pivoted upper and pivoted lower sashes.
Type J—Casement sashes hinged to swing in.
Type J2—Casement sashes hinged to swing out.
Type K—Hinged at side to open in.
Type K2—Hinged at side to open out.
Type K3—Hinged at sill to open in.
Type K4—Hinged at head to open in.
Type K5—Hinged at head to open out.
Type L—Single Pivoted Sash.
Type M—Single vertically pivoted sash.

The principles of construction of the Lupton Window are applicable to any window, anywhere, in any building exterior, or partition walls.

Waldmire Louver

(Patented)



CONSTRUCTION Waldmire Louvers are made continuous with lap joints; no solder is used. The Louvers are spaced six inches on centers and are set outside of the vertical supports, fastened with ferrules and spikes to wood posts or with bolts to steel work.

ERECTION Any building foreman can erect the Waldmire Louvers with unskilled labor; no soldering or any metal working tools are necessary.

ECONOMY No waste of materials, because continuous Louvers are outside of posts. No solder or rivets used. Erected with unskilled labor. The Waldmire Louver is more durable than any Louver made in panels between posts that depend upon soldered joints for weather-tightness.

VENTILATING SIDING For tobacco barns and other buildings where constant ventilation is required we furnish the Waldmire Siding, of same construction as the Louver. The siding is laid twelve inches on vertical centers. The cost of material and labor compares favorably with any ventilating siding.

SPECIFICATION Specify Waldmire Louvers or Waldmire Siding manufactured by David Lupton's Sons Company, Philadelphia, Pa., and erected by the contractor.

ESTIMATES Send plans and specifications at our expense. We will estimate and return plans promptly. Unless requested to erect our proposals are f. o. b. Philadelphia, with freight charges allowed to destination.

DELIVERIES Louvers are carried in stock in 10-foot lengths. Space vertical supports 59¼ inches on centers to provide 1½-inch lap joints.

The Lupton Factory guarantees quick shipment on special cornice mould and roof aprons in connection with Louvers, but these are not furnished unless specifically called for in inquiries.

Installations

Some Recent Installations of Lupton Products

American Can Company, Baltimore, Md.; Toledo, O.; Lubec, Me.; Fairport, N. Y.; Joliet, Ill.
American Car and Foundry Company, Detroit, Mich.
American Iron and Steel Manufacturing Company, Lebanon, Pa.
American Sheet and Tin Plate Company, Vandegrift, Pa.; Cambridge, O.; New Philadelphia, O.; New Castle, Pa.; Wellsville, O.; Guernsey, O.; Gary, Ind.
American Steel and Wire Company, Allentown, Pa.; Waukegan, Ill.; Worcester, Mass.; Cleveland District; Pittsburgh, Pa.; South Sharon, Pa.; Trenton, N. J.
Ames Plow Company, South Framingham, Mass.
Armstrong Cork Company, Lancaster, Pa.; Camden, N. J.; Beaver Falls, Pa.
Aspinwall Pumping Station, Pittsburgh, Pa.

Bethlehem Steel Company, South Bethlehem, Pa.
Boldt, Charles, Company, Huntingdon, W. Va.
British American Tobacco Company, Petersburg, Va.; Richmond, Va.

Carnegie Steel Company, Edgar Thompson Works; Duquesne Steel Works; Youngstown Works; Cleveland, O.
Central Moron Sugar Company, Havana, Cuba.
Central Railroad of New Jersey, Elizabethport, N. J.; Jersey City, N. J.; Communipaw, N. J.; New York, N. Y.
Chase Rolling Mill Company, Waterbury, Conn.
Chicago, Rock Island & Pacific Railway, Chicago, Ill.; Little Rock, Ark.; Silvis, Ill.; Manly Junction, Iowa; Trenton, Mo.
Cleveland Electric Illuminating Company, Cleveland, O.
Corning Glass Works, Corning, N. Y.
Cyphers Incubator Company, Buffalo, N. Y.

Deere & Co., Moline and East Moline, Ill.
Delaware, Lackawanna & Western Railway, New York; Scranton, Pa.; Nanticoke, Pa.
Diamond Match Company, Oswego, N. Y.

Eastwood, James, Estate, Paterson, N. J.
Erie Malleable Company, Erie, Pa.

Ford Motor Company, Detroit, Mich.; Philadelphia, Pa.

General Electric Company, Erie, Pa.; Schenectady, N. Y.; Lynn, Mass.; East Boston, Mass.; Everett, Mass.; Pittsfield, Mass.; Harrison, N. J.; East Cleveland, O.
General Vehicle Company, Long Island City, N. Y.
Goodrich Rubber Company, B. F., Akron, O.
Goodyear Tire and Rubber Company, Akron, O.
Guerney Electric Elevator Company, Honesdale, Pa.

Harlan & Hollingsworth Corporation, Wilmington, Del.
Hazel Atlas Glass Company, Washington, Pa.; Clarksburg, W. Va.
Hearst Building, Chicago, Ill.
Hendee Manufacturing Company, Springfield, Mass.

Imperial Railway of Japan.
Ingersoll Rand Company, Phillipsburg, N. J.; Easton Pa.; Athens, Pa.
International Harvester Company, Chicago, Ill.; West Pullman, Ill.; Milwaukee, Wis.; Springfield, O.; Auburn, N. Y.; Hamilton, Ont., Canada.

Johns Hopkins University, Baltimore, Md.

Kingston Coal Company, Kingston, Pa.

Lake Shore & Michigan Southern Railroad Company, Air Line Junction, O.; Ashtabula, O.
Lehigh Valley Coal Company, Wilkes-Barre, Pa.; Pittston, Pa.; Buck Mountain, Pa.
Lehigh Coal and Navigation Company, Lansford, Pa.
Louisville & Nashville Railroad Company, Louisville, Ky.; Irvine, Ky.
Lumen Bearing Company, Buffalo, N. Y.

Manita Sugar Company, Cuba.
Maryland Steel Company, Sparrow Point, Md.
Mazda Lamp Company, Youngstown, O.
McElwain, W. H., Company, Manchester, N. H.
Mead Morrison Manufacturing Company, East Boston, Mass.
Mississippi River Power Company, Keokuk, Iowa.
Mott, J. L., Company, Trenton, N. J.

National Carbon Company, Cleveland, O.; Niagara Falls, N. Y.; Fostoria, O.
National Tube Company, Wheeling, W. Va.; Versailles, Pa.; Kewanee, Ill.; Syracuse, N. Y.; Lorain, O.; Pittsburgh District.
New York Central & Hudson River Railway Company, West Albany, N. Y.; Buffalo, N. Y.; Oswego, N. Y.; Avis, Pa.; Ashtabula, O.
New York & Pennsylvania Company, Lock Haven, Pa.; Johnsonburg, Pa.
Nueva Fabrica de Hielo, Havana, Cuba.

Oneida Community, Limited, Oneida, N. Y.
Otis Steel Company, Cleveland, O.
Owens Bottle Machine Company, Toledo, O.; Fairmont, W. Va.

Packard Motor Car Company, Philadelphia, Pa.; Detroit, Mich.
Penn Central Light, Heat & Power Company, Williamsburg, Pa.
Pennsylvania Railroad Company, Lines West, Cleveland, O.
Philadelphia & Reading Railway Company, St. Clair, Pa.
Pressed Steel Car Company, Pittsburgh, Pa.
Pullman Steel Car Company, Pullman, Ill.

Republic Rubber Company, Youngstown, O.

Sanitary Can Company, Fairport, N. Y.; Niagara, Falls, N. Y.
Seaboard Air Line Terminal, Savannah, Ga.
Snellenburg, N., & Co., Philadelphia, Pa.
Southern Pacific Railroad Company, Galveston, Tex.
Strouse & Bros., Baltimore, Md.

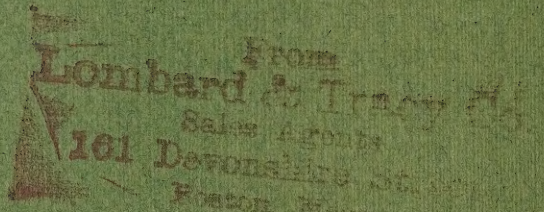
Timken Roller Bearing Company, Canton, O.
Tin Decorating Company, Baltimore, Md.
Toledo Glass Company, Toledo, O.
Trenton Fire Clay and Porcelain Company, Trenton, N. J.

Union Tool Company, Los Angeles, Cal.; West Chicago, Ill.
United Gas and Electric Corporation, Elmira, N. Y.
United Gas Improvement Company, Philadelphia, Pa.
United Shoe Machinery Company, Beverly, Mass.
United States Aluminum Company, St. Louis, Mo.; New Kensington, Pa.; Niagara Falls, N. Y.; Massena, N. Y.
United States Navy Yard, Foundry, Washington, D. C.

Victor Talking Machine Company, Camden, N. J.
Virginia Power Company, Cabin Creek Junction, W. Va.

Wagner Electric Manufacturing Company, St. Louis, Mo.
Wanamaker, John, Philadelphia, Pa.
Westinghouse Electric and Manufacturing Company, Turtle Creek, Pa.; East Pittsburgh, Pa.
Whitehead & Hoag Company, Newark, N. J.
Wilkes-Barre Iron Manufacturing Company, Wilkes-Barre, Pa.
Williams, J. H., & Co., North Tonawanda, N. Y.
Willys-Overland Company, Toledo, O.
Winchester Repeating Arms Company, New Haven, Conn.

Edward Stern & Company
Engravers and Printers
Philadelphia New York


From
Lombard & Tracy
Sales Agents
161 Devonshire
Boston